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Specific Antigens
For
Ivy and Oak Poison

- The investigations of Strickler on Ivy and Oak Poison, the two most distressing diseases of the derma, enable us to offer Rhus. Tox. (Poison Ivy) and Rhus. Ven. (Poison Oak) Antigens as specific cures for dermatitis venenata. Jour. A.M.A. 77; 910 Sept. 17, 1921; 6-2-23.
- Strickler further states "I know of no method of treatment with such a small percentage of failures."
- "The immediate relief from the persistent paroxysmal itching and severe local inflammation is often magical."
- Bivings states "cases of poison ivy treated with Rhus Tox. Antigen show a remarkably high percentage of complete recoveries in a short period so that patients are relieved entirely, usually within forty-eight hours." Arch. of Derm. and Syph., May, 1924.
- Williams and Macgregor reporting their series of cases of Ivy Poison from The New York Skin and Cancer Hospital state "Until Strickler developed the treatment and his Antigen was made available the treatment was purely expectant and no real relief could be promised. The most striking feature is the rapid improvement usually after a single dose, observed in early and in late, in mild and especially in severe cases." Arch. Derm. and Syph., Oct., 1924, also Med. Jour. and Rec., June 4, 1924.
- Rhus Tox. and Rhus Ven. Antigens are accepted by The Council on Pharmacy and Chemistry; they are furnished in pkgs. containing 4-1 cc. Ampoule-Vials, Price to Physicians $3.50 per pkg.
- The Antigens reported by Strickler, Bivings, Williams and MacGregor are prepared by The American Chemical Laboratories of Philadelphia and distributed by

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Special Article*

Twentieth Century Progress

*From the Editorial Department of the MEDICAL TIMES. For some years past this journal has issued an Annual Progress Number, in the course of which work it has occurred to the editor to attempt a general orientation covering so much of the century as has elapsed. This contribution, it is believed, provides such an orientation.

The most striking development of anatomy consists in a return to the inseparability of structure and function foreshadowed by Leonardo da Vinci. It is no longer possible to discriminate absolutely between gross and microscopic anatomy, between function and structure, between normal and pathological. The result has been the conception of new systems of organs, in some of which there is no structural continuity. One of the first to suggest itself is the endocrine system. While its roots extend into the past century it is virtually a product of the present. Next may be mentioned the reticulo-endothelial system, the elements of which are recognized in part by peculiar staining properties and the function of which appears to be the defence against infection. As in the endocrine system structure seems to recede greatly in importance in favor of function. The structural elements of this system are to be found in the blood, endothelia, lymphnodes, spleen, liver, etc. Our conception of this system originated with Aschoff and his associates, whose pioneer report was published in 1913. Among earlier efforts which made it possible may be mentioned Goldman's discovery of vital staining (1909).

A third system developed during the century is the autonomous or sympathetic-parasympathetic. Although its beginnings go back far into the XIXth century our conception has only matured since the publication of Gaskell's (posthumous) monograph in 1916, followed by Langley's work in 1920. Derived from this conception are the phenomena of vago-and sympathicotonia as first described by Eppinger and Hess in 1910. In this connection may also be mentioned the work of Alvarez, beginning 1914, on the autonomy of the peristalsis of the gastroenteric tract, which is largely independent of nervous influence.

The study of a special portion of the heart muscle distinct from the myocardium in general and independent of nervous influence, which is distinct moreover for each auricle and ventricle, seems to have culminated in recent work by Vaquez and his associates; this apparatus, which is responsible for the heartbeat, has been termed the *"cardio-necteurs"* or heart connecters and is described in great detail in a monograph by Géraudel (1928). Many have worked in this field, especially Lewis (1910-13).

What has been styled by Cushing the "third circulation" refers to the circulation of the cerebrospinal fluid from its origin in the choroid plexus to its absorption in the venous sinuses, the intervening paths having been accurately plotted. This research was inaugurated by Cushing, Dandy and their associates in brain study about 1913.

The extrapyramidal conduction system of the cerebrospinal axis had its beginnings in 1910 and was advanced by the work of Wilson in isolating the disease known by his name—lenticular degeneration—in 1913. Numerous other investigators have contributed to our knowledge of the physiological anatomy of this system.

Still another of these systems which have to do with the central nervous system is that of Head, involving both the cutaneous and deep sensibility, which also constitutes a phase of segmental anatomy indicated by the term "Head's zones." His studies in this field began early in the century and are presumably still in progress.

Space does not suffice to sum up the numerous studies of the cerebellum, basal structures, special cranial nerve origins, etc., in which structure and function, pathology, etc., are jointly considered. The neuronal system of the central nervous system is of course a product of the XIXth century (Waldeyer, 1891).

Of studies more essentially physiological may be mentioned the newer reflexes—the proprioceptive of Sherrington (1909), the conditional of Pawlow and associates, first described in 1911, the postural reflexes of the monograph of Magnus (1916), and the "mass reflex" of Head associated with shell shock (1920). So great is the importance of the discovery of the conditional reflexes that Watson has made it the nucleus of his theories of human behaviorism. Present day literature is silent as to the spino-visceral reflexes, once an active subject.

A. V. Hill began his research into the thermodynamics and chemodynamics of muscle in 1909 and his book *Living Machinery,* published 1927, which sums up his experience, gained him a Nobel prize.

Barcroft and also Haldane have done much original work on the respiratory function of the blood, gas exchange, etc. Both have studied respiration at high altitudes and mountain sickness and have devised new apparatus. Barcroft, whose monograph on the *Respiratory Function of the Blood* appeared in 1914, has recently made dangerous self-experiments, while Haldane's work is carried out largely in connection with occupation and industrial diseases.

In 1904 Atwater introduced his respiration calorimeter into laboratory use and numerous studies have been made of resting or basal metabolism, general metabolism and brain work, fasting, etc. New ideas have been obtained as to minimum food requirements.

In 1904 Weichardt published interesting researches on fatigue poisons and sought a serum to antagonize muscle fatigue. However, nothing has apparently resulted from this initial effort and the theory itself has been assailed as unsound.

A subject of great importance for diet and disease is the acid-base equilibrium and the possibility of dividing all food substances by the composition of their ash into acid-formers and alkali-formers. Much work in this field has recently been done on the Pacific slope.

A few years ago it seemed that our textbooks on human physiology enjoyed the dubious distinction of being founded largely on experiment on the lower animals. In the near future, thanks to the developments of physiological anatomy, it may transpire that these volumes will really give us a physiology which will be far more taken up with the human subject at the expense of comparative physiology.

The transition from study of function to bio-chemistry is an easy one but the latter comprises many special aspects of study, much of it restricted to the chemical laboratory. Here may be discussed the endocrine system with special reference to the study of the hormones, including their pharmacodynamic activities. A common histological substratum for the endocrine organs is hardly possible and one no longer encounters such terms as "chromaffin cells" and "chromaffin system," once used for a group of these organs and based on certain staining properties. For all we know, something like an incretion may be formed by all cells.

Owing to the vastness of this subject we can only touch on some of its more salient features. An intensive and continuous study of the hormones was begun by Bayliss and Starling in 1902 and in 1903 adrenalin was isolated by Takamine; after its composition had been indicated by Stolz in the following year it was possible to make it by synthesis. In 1905 Winter discovered its remarkable ability to stimulate the heart action. Although pituitrin was not to be isolated for many years Blair Bell showed the oxytocic power of extract of hypophysis in 1906. The efficacy of thyroid feeding in thyroid deficiency was known well back in the XIXth century but the true active principle, thyroxin, was not isolated until 1914 by Kendall, when it was found to be a great activator of metabolism. Its iodine content makes it doubtful as to the relative rôles of an incretion *per se* and the iodine element. Remarkable results in thyroid deficiency could not have been attained from the use of iodine alone and yet this substance is believed to be able to prevent goiter and is used as a mass prophylactic in goitrous regions. Thyroxin was synthesized by Harington in 1925 and the synthetic form has been shown to possess properties which differ somewhat from those of the natural substance.

In 1922 came the epoch-making discovery of insulin by Banting and Best, representing the internal secretion of the pancreas (islets of Langerhans), the action of which is in full harmony with what had long been known of pancreatic failure as a cause of diabetes. Insulin is, however, believed to have a sphere of action much broader than this hormonal use. Had it not been for the insulin discovery and its therapeutic use the fasting treatment of Allen, for diabetes, proposed in 1913 after years of research, would have been hailed as a great advance, as indeed it was for some years of interval.

The results of gonad grafting, especially in the male, with those obtained by Steinach from ligature of the vas deferens, have given rise to a controversy which is not the less acute because it is largely "silent." The claims for rejuvenation are loud, numerous and often sincere, but an author like Garrison is quite silent on the subject —save for the inter-sexual experiments on the lower animals—and as far as we know the subject is ignored by clinics of the type of the Mayo Foundation. Failure to isolate hormones from the gonads is probably a contributory factor. In 1926 Collip obtained a hormone from the parathyroid and in 1928 Kamm succeeded in isolating twin hormones from the pituitary, one of which seems a specific for promoting water retention in the abnormally lean subject.

Partial excision of the adrenals by a number of surgeons has notably reduced the frequency of epileptic seizures in unusually severe cases, and grafting a bit of adrenal substance into a subject with Addison's disease seems to have secured a remarkable temporary arrest of the severe symptoms.

Certain new clinical types of dysplasia have been isolated, as Cushing's dyspituitarism (1911) and Simmon's pituitary dwarfism (1915). It is probable that Kretschmer's "dysplastic type," elucidated in his studies of anthropology in relation to insanity, is endocrinic in origin.

Next in order to endocrinic physiological and pathological activity may come the joint subject of growth agents, nutrition, vitamines and deficiency diseases. The two shade into each other, for hormones as well as vitamines and other growth agents stand in close relation to growth and nutrition. The growth agent, however, is something introduced from without, while the hormone, save when given as a remedy, is produced by the body itself.

Certain of the split products of the diet proteins have growth-forwarding properties, as shown especially during the period 1913-6 by Abderhalden, Osborne, Hopkins and numerous others. Some of these are tyrosin, lysin, histidin, tryptophan, etc., and proteids which do not split off such substances are unsuitable for children's food. However, this phase of the subject belongs more to cattle feeding and laboratory experiment than to human path-

ology, although in famine conditions and marked underfeeding—for example in certain cases of pellagra—this factor may have some clinical significance. The importance of these protein split products is greatly overshadowed by that of the vitamines in the strict sense of the term. At the beginning of the century our knowledge was restricted to the results of study of beri beri associated with a diet of polished rice.

In 1906 the British biochemist Hopkins began a systematic study of "accessory growth factors" which has continued up to the present day. The first attempt, however, at a definite generalization was made by Funk, who coined the word "vitamine" about 1911 and forecast that deficiency in vitamine might eventually account for a group of diseases to include scurvy, rickets and pellagra. Our modern conceptions of vitamines "A, B and C" were not formulated until a few years later, numerous investigators having contributed to this end. For several years our knowledge of these substances was restricted to the A, B, C group, but in 1917 Windaus not only postulated the existence of a vitamine D, deprivation of which tended to produce rickets, but he suggested that this alleged vitamine was nothing more than cholesterin.

The clinical significance of vitamines is disappointing, for privation of A cuts little figure save in actual famine, and B has to do only with the exotic disease beri beri. Vitamine C is concerned with the production of scurvy and adult scurvy is at present very rare. Our practical gain is chiefly in infantile scurvy, and involves the modern use of certain dietetic articles in the feeding of children, notably orange juice, etc., which has become an extensive custom.

In the case of rickets and pellagra several other elements enter, so that these affections cannot be classed as pure avitaminoses. But little is known of the relation of vitamines to pellagra and just at present privation of a fraction of B vitamine is accused. All in all it is likely that our present conception of vitamines will soon be modified.

One of the phases of bio-chemistry in which there has been a radical change over older teachings has to do with the tissue enzymes. Pawlow's *Work of the Digestive Glands* appeared at the very beginning of the century, although the research upon which it is based was conducted during the preceding period. About the same time O. Cohnheim announced the discovery of erepsin, and in 1902 Bayliss and Starling that of secretin. The number of new enzymes now mounted rapidly, including the intracellular, until in order to comprehend their number and variety one must study the successive editions of monographs like that of Oppenheimer. Hardly any metabolic process can take place without the agency of some enzyme, but owing to the fact that these bodies elude isolation and analysis and cannot be synthesized we know little of their nature, and their application to medicine is not productive of much practical result. Abderhalden's ferment reactions (1912) gave some promise in the diagnosis of various diseases and pregnancy, but have not come into general routine use. Enzymes are still regarded simply as catalysts, and the latter are not as a class of organic nature, but occur in abundance among inorganic substances.

One of the great divisions of bio-chemistry has to do with the decomposition of complex organic substances and the building up of the same by synthesis of simple ones. This laboratory activity often parallels the tissue chemistry of living animals and the two subjects are intimately associated. The earlier efforts of Emil Fischer had to do with the last century, and largely with the simpler substances, especially carbohydrates. His authoritative work on the chemistry of proteins appeared in 1906. In addition to his purely scientific work he was active in practical fields, and during the war his talents were applied especially to the synthesizing of food substitutes. His activities were continued by his former assistant Abderhalden, who in cooperation with numerous associates showed prodigious activity. His great *Handlexicon*, which first appeared in 1911 and now consists of many volumes, is a complete register of all organic compounds, their properties, preparation, tests and practical uses. He has also produced equally voluminous works on technic. His individual contributions, like those of Fischer, are too numerous to mention.

Synthesis as applied to drugs and the building up of new molecules and modification of old ones for elimination of deleterious by-action is another extensive ramification of bio-chemistry. Many of these efforts go back to the last century, but the work has gone ahead with such valuable synthetics as veronal and luminal, salvarsan, fibrolysin, novocain, etc. Albert Fraenkel, like Abderhalden a prolific writer, published early in the century a classic on the relation between chemical constitution and physiological action, which sums up the entire subject of purposive drug synthesis. This work has been amplified in successive editions.

Another branch of bio-chemistry which stands in close connection with improvements in diagnosis has to do with the analysis of blood, urine and other fluids. Bang's monograph on micro-methods (1911) marked an advance because it became possible to analyze minute quantities of blood, etc. Innumerable tests have been evolved for the normal and accidental constituents of blood and urine, but despite numerous real advances the majority of these tests seem to come to naught and cannot be depended on in diagnosis without corroboration.

Although the foregoing items by no means exhaust the lines of development of bio-chemistry (including the sections on hormones, vitamines, etc.), it will not be advisable to continue our narrative in this connection because the subject of bio-chemistry is bound to reappear in other associations.

Before abandoning the fundamentals of medicine for the clinical and practical, space should be given to such subjects as cytology, as a phase of general biology, which has intimate contacts with medicine. This subject shades into numerous others, such as reproduction and embryology, growth rate, staining properties, tissue cultures, cell inclusions, etc., and has to do with the nucleus, chromosomes, reticulum, mitochondrias and other elements of the cell.

Perhaps the first subject to bring up is the physical chemistry of the cell, as discussed in the epoch-making work of Hoeber on *Physical Chemistry* (1902). This author showed close analogies, based on common physico-chemical properties, between a living cell and an inert droplet, which analogies tend to awaken anew the old arguments of the mechanists and vitalists.

Tissue-including pure cell culture *in vitro* was introduced in 1907 by Harrison in the successful attempt to demonstrate the truth of the neuronal theory, while at a later period Carrel succeeded in making pure cultures of many kinds of cell, pathological as well as normal—leucocytes, cancer cells, etc. These cultures may be kept viable for years and illustrate "cell immortality."

The problem of cancer genesis is bound up largely in this very subject of cell culture because it is possible to differentiate between normal and malignant cells; but while the differences are manifest it cannot be asserted that they have thus far illuminated the nature of malignacy, although they furnish a number of promising leads.

The subject of cell staining, once regarded as no more

than a means of identification, has in the course of time, especially since the introduction of vital staining (1909), become an invaluable means of research into cell physiology. The ability of a cell to absorb a dye may stand in a definite relation to its specific function. Differential staining revealed the difference between the "specific myocardium," or autonomous motor apparatus of the heart, and the myocardium in general. And it is through staining properties that the reticuloendothelial cells concerned with the defence of the body against infection were differentiated.

The recognition of the sex chromosomes was announced by McClung in 1902 and inaugurated a long line of research into heredity. In this connection is the place to mention the lifelong activities of Jacques Loeb on cell fertilization by artificial means. Much of his work really belongs to the last century, but his matured conclusions have appeared in book form within recent years, as *The Organism as a Whole* in 1916. Loeb is entitled to the credit of demonstrating that fertilization is essentially a chemical process.

Another cellular subject of great importance is that of the "cell inclusion" which was first studied in the last century. These bodies—cells containing inclusions—have continually been found in infectious diseases of all kinds, and have frequently been confounded with living organisms, for they have even been cultured. But at the present day they are regarded as an appanage chiefly of diseases transmitted by an ultravisible virus, although it must be admitted that in a few cases they have been found in affections due to known bacteria, while they have been absent in some ascribed to ultravisible virus.

We may now pass to the relations of microörganisms to the etiology of disease, the actions of antigens and the defence reactions, the developments of immunity and sensitization, etc. Advance along this line must be due largely to collateral developments in the basic sciences, the study of exotic diseases among primitive peoples, the resources supplied by state and private means, etc. At the same time the mere momentum of older methods is bound to promote further knowledge. The invention of the ultramicroscope in 1903 was of no small service in this direction, while the study of protozoa by a specialist like Schaudinn, aided by the new optical apparatus and new staining methods, was responsible for the discovery of the cause of syphilis—the *Treponema pallidum*—in 1905. In the same year Castellani discovered a similar organism as the cause of yaws.

In 1903 Negri found peculiar bodies in the brain of animals dead of rabies which have since served the purpose of a diagnostic criterion, although throwing no light on the nature of the malady.

During the period 1901-9 important discoveries were made as to the causation of exotic diseases by certain organisms with insect transmission. Various protozoa, notably spirochetes and trypanosomes, were found to cause such affections as African sleeping sickness, African relapsing fever, Rocky Mountain fever, epidemic jaundice, ratbite fever, etc., the transmission having been due to certain flies, ticks, etc. Nicolle in Europe in 1909, and Ricketts in the United States in 1910, proved that typhus was transmitted by body lice, although the cause is still undetermined. It is worth noting in passing that in this group of cases ordinary bacteria did not figure, but instead protozoa and invisible viruses (rabies, typhus). It was apparent that bacteria which are of plant nature were not to have a monopoly in the causation of disease.

In 1912 a new bacillus was discovered by Chapin in certain diseased squirrels and two years later it was recognized in mankind; but its pathogenicity was not understood until 1919, when Francis proved that it was the cause of so-called deer-fly fever and was transmitted in part by insects, but also by handling rabbits and other game. The same scientist named the disease tularemia and the organism *B. tularense*—local designations. The disease has since assumed national importance and has doubtless often been masked as typhoid with negative Widal. Of like importance is the recognition that undulant fever is endemic in the United States by Gentry and Ferenbaugh, while in 1917 Alice Evans demonstrated the identity of this affection with infectious abortion in cattle—that is, the same organism is the cause of both diseases and one may transmit the other, although in the clinic each often pursues an individual course. Incidentally the original bacteria accused of causing these diseases occur in different strains with slightly different properties, and Evans in 1923 synthesized them into a group termed Brucella which may possibly also comprise the *B. tularense*.

In 1920 the announcement by Noguchi that he had discovered a spirillum as the cause of American yellow fever seems to have been incorrect, or at least no such organism has been found for African yellow fever, and the tragic death of Noguchi has prevented him from reviewing his original experiments. His alleged spirochete may possibly prove to have been identical with the cause of epidemic jaundice, which suggests a possibility of mistaken clinical diagnosis of the disease. The two affections possess much resemblance and have sometimes been confused in past episodes.

In 1923 the Dicks announced that the cause of scarlet fever is a strain of the *Streptococcus hemolyticus*, and they have gradually developed skin tests of susceptibility, blood tests and an antitoxin, but, while the latter appears to exert a specific control over the disease, there is a good deal of doubt as to the specific character of this streptococcus and the entire subject is still in the debatable stage.

In 1927 Noguchi determined that the cause of Oroya fever and verruca peruana is the *Bartonella bacilliformis*, while in the following year he seems to have isolated the *Bacillus granulosis* as the cause of trachoma.

Naturally there have been many advances in the technics of bacteriology, such for example as the method of typing the pneumococci (1913), the strains of which show differences in virulence of prognostic value. A remarkable discovery is that bacteria in cultures may dissolve themselves and that this lysis is transmissible. First noted by Twort in 1915, the entire subject has been exhaustively studied by d'Herelle, beginning in 1917. His monograph on the subject of the "bacteriophage" has now gone through two editions.

The most striking achievement in the transmission of disease by an invisible virus is probably the discovery by Peyton Rous that a cell-free filtrate can cause fowl sarcoma; important because it has given rise to a line of research into the causation of cancer, including the sensational claims made by Gye and Barnard which have not yet been established.

As to diseases due to molds and fungi, Beurmann and Gougerot published their monograph on sporotrichosis in 1912, and Castellani, beginning in 1905, has described an entire group of mycoses, work of much clinical value.

While on the subject of new infectious diseases we should not neglect a few in which no bacterial cause has been isolated. Chief among these is encephalitis lethargica, also known as epidemic encephalitis and sleeping sickness. First described by Economo in 1917, it has appeared in most regions of the world, in small incidence but with high mortality, and now has an enormous literature. There is something about the present century

which seems to favor the development of encephalitis in ordinary infectious diseases in an unusual degree. Among these are influenza, measles and especially the variola group. In this connection we may allude to vaccination encephalitis, which has appeared in small groups in Holland and England. It is believed that a common susceptibility underlies both the essential and secondary forms of encephalitis and that this is transitory. Already sleeping sickness has lost its epidemic character.

Of great interest is the recent work of Frei and others, which has shown that the chancroid may cause secondary symptoms and may give a skin reaction; and which also differentiates chancroidal bubo from another form variously known as *bubon d'emblee,* strumous bubo, tropical bubo, etc. This last form has recently been styled by various names, as lymphogranulomatosis inguinalis, poradenitis, etc. It is readily distinguished from chancroidal bubo by the skin tests and absence of Ducrey's bacillus, is not a veneral disease, and thus far no cause has been isolated. It presents numerous discharging fistulae but never ulcerates *in situ* like a chancroidal bubo.

The so-called tropical disease known as granuloma inguinale has been shown to occur spontaneously in the United States, its cause being still undecided. In the past it has doubtless posed as phagedenic chancroid, etc.

The subject of the reaction of the tissues to the toxins of microörganisms is so vast and intricate that it must be passed over as succinctly as possible. Richet's studies on anaphylaxis appeared during 1902-9 and at the same time Pirquet and Schick were at work on allergy, Pirquet having described serum sickness in 1905. In 1907 Besredka introduced the notion of desensitization and of anti-anaphylaxis. The subject of food idiosyncrasies was brought in association with this lore about 1911 and has since received due attention. It does not appear that much progress has been made along this line as far as basic principles are concerned—although in 1925 Besredka introduced his theory and practice of local "immunity" without the intervention of antibodies in the blood—but these underlying principles have been abundantly utilized in practice, both for diagnosis and treatment of disease, including prophylaxis. Naturally the beginnings in this field go back into the previous century with the pioneer work of Pasteur, Koch, Behring and others, and the work of the present century must be concerned largely with consolidation and exploitation.

To return for the moment to the subject of new diseases, something should be said of experimental affections. About 1903, syphilis was communicated to the higher and lower simians by Metschnikoff and Neisser, while later it was inoculated successfully into rabbits and other animals. Artificial cancer has been studied chiefly in rodents—mice, rats—beginning with Jensen in 1902-3, who studied especially the heredity component; while Maud Slye began her studies of mouse immunity and susceptibility in 1913. Among the acute infections may be mentioned especially Flexner's experimental poliomyelitis (1910), and among diathetic diseases Mellanby's experimental rickets (1910). Deficiency diseases have already been noted under this head.

The subject of new diseases and new etiologies of disease is not yet exhausted and there is hardly an organ or tissue in the body that has not received some notable addendum to its list of infirmities. In regard to the heart, auricular flutter was first described by Lewis in 1912, while Libman and his associates in the Mount Sinai Hospital have described new forms of endocarditis, beginning in 1910. In 1908 Buerger first described his thromboangiitis obliterans. Among new blood diseases may be mentioned Herrick's sickle cell anemia (1910) and Schultz's agranulocytosis (1922). Under the head of new renal diseases we find, isolated by physicians of the Mount Sinai Hospital, lipoid nephrosis (regarded by some as a general malady) and renal carbuncle.

In 1905 König described his osteochondritis dissecans and in 1910 Naunyn isolated infectious cholangitis. This list is far from complete, and in fact these new maladies are cited chiefly as examples. Under neurology, in place of definite diseases, we have principally syndromes. The name of these is legion, for Déjerine alone must have half a dozen or more to his credit, while Ramsay Hunt has at least two which go by his name. Of functional nervous affections, Janet identified psychasthenia in 1903, and with the progress of psychoanalysis others have come to the front.

Here is doubtless the place to cite the doctrine of focal infection, which is not yet accepted by Continental Europe and appears to be of chiefly American origin (Benjamin Rush), although an Englishman, John Hunter, was one of the pioneers. Although apparently upheld by the Mayo Clinic, Garrison barely alludes to it, and we infer that, like gonad grafting and other rejuvenation efforts, it is still very much in the air and in case of failure will in the end prejudice the medical profession with the public.

From experimental medicine and etiology it is an easy transition to experimental surgery, or as some prefer to call it, physiological surgery, a subject which also naturally links up with physiological anatomy. Pawlow's great work on the stomach pouch of the dog belongs of course to the preceding century. The most striking development of the present one is to be credited to Carrel in connection with improved transplantation, which incidentally involves improved suture technic of vessels and nerves. As an accessory development must be mentioned the preservation of explants and tissues in general in a viable state over indefinite intervals. For his work along these lines Carrel received the Nobel prize in 1912. A large amount of physiological surgery of the intracranial region is to be credited to the neurological surgical clinic of the Johns Hopkins Hospital-College under Cushing and later Dandy and their associates, especially in relation to the nature of hydrocephalus. Other work under experimental surgery is largely a continuous development of the work of the previous century.

The Great War naturally affected both medicine and surgery through supplying new etiological factors. Such new affections as trench fever, trench foot and trench mouth, certain syndromes from famine, the nervous state known as shell shock, and wound complications like gas phlegmon and gas gangrene prevailed extensively and have thrown light on pathology in general. Surgical cleanliness no longer sufficed to prevent wound complications and preventive inoculation sometimes failed. Typhus fever once more became a familiar subject in the medical news, and as an aftermath of the war came the deadliest of all pandemics of influenza, almost suggesting at times a return of the old Black Death.

There are still a few subjects which demand attention before we arrive at the all important ones of diagnosis, treatment, prophylaxis, etc. One of these is anthropological and refers to the revival of the lore of the physical and mental constitutions and their relationship to pathology. For many decades the earlier efforts to correlate structure with function and disease slumbered as a result of the collapse of the pseudo-scientific efforts of Gall, Spurzheim, Lavater, and others. The old

French conception of diathesis had also seemingly passed out for good. But during the present century numerous works have appeared with a rational basis, in Garrison's opinion brought to a focus through the anthropological studies of troops. Other contributory factors were present, as the influence of the endocrines on the body make-up and mentality. New conceptions appeared in ordinary speech, such as the term personality, replacing older terms like character and individuality. It is almost too soon to sum up the advance along these lines, but one may point out especially the work of Kretschmer, which indicates the relationship between habitus of body and type of insanity (1921), and Jung's two psychic types of extrovert and introvert. Draper (1924) has shown a relationship between habitus and certain diseases. So-called "study of the individual", or characterology, is still too much in the empirical stage.

The transition to advance in psychology is natural in this connection, including its pathological aspects. In 1905 the Binet-Simon tests for intelligence first came into general use. Watson's doctrine of behaviorism (1914) has already been mentioned. For the rest the revolutionary work of Freud and his school, beginning 1903, has completely swamped all other advance in psychology and threatens the stability of almost all prior teachings.

We may now enter into the province of clinical medicine and surgery, including laboratory activities, and consider side by side the developments of the older resources and new departures. Roentgen-ray diagnosis has undergone a steady progressive development, as shown by the fact that pyelography came into being in 1906 along with the use of bismuth paste, while during the period 1908-1913 various German authors did much work along the lines of "roentgen anatomy", especially of the stomach. In 1913 both the Coolidge tube and Potter-Bucky diaphragm came into use, in 1915 Weber introduced pneumo-peritoneum, and in 1918 Dandy gave us ventriculography and the diagnosis of brain tumors by ventricular estimation. As a sort of crowning achievement, at least for American roentgenography, came the epoch-making cholecystography of Graham and his associates, in 1922.

In so far as improvements in diagnosis consist in increasing visibility we may add to the preceding the ultramicroscope already mentioned, the suspension laryngoscopy of Killian (1912), and the slit-lamp of Gullstrand, now in common use by ophthalmologists, in 1902.

Of new registration apparatus the string galvanometer of Einthoven (1903) has revolutionized cardiac diagnosis. Many new devices for estimating blood pressure have been introduced but this resource has probably passed its peak, has been vulgarized, and may do as much harm as good (Christian).

For obtaining new access to occult organs we should call attention to Einhorn's duodenal bucket (1908) and the tubage of Meltzer and Lyon, which make it possible to obtain readily the contents of the duodenum for rapid testing. Also perhaps the practice, quite recent, of taking "borings" from the liver and other accessible organs in the diagnosis of amyloid disease, etc.

The number of clinical and laboratory tests involving skin reactions, subcutaneous injections, intravenous injections, examinations of blood, urine, sputum, cerebrospinal fluid, etc., is so vast as to have become unwieldly, while the greater portion is of questionable value. It behooves us, therefore, to make a wise selection if possible, in separating the wheat from the chaff. Schick's skin test for susceptibility to diphtheria seems to be of permanent value (1913), but at the present writing this may not be true of most other tests of the same nature. In 1907 von Pirquet introduced his skin reaction for tuberculosis and in the same year Calmette published his conjunctival test, but as in the case of Koch's earlier tuberculin test, these resources prove untrustworthy in our country, for they may be positive when there is no other reason to suspect the disease. The luetin test of Noguchi is not much used in syphilis. In regard to the pharmacological tests for vago-and sympathicotonia we are more or less at sea and the original diazo reaction has long since been abandoned.

On the other hand Wassermann's serodiagnosis of syphilis (1906) still holds its original place and has been reinforced by various flocculation tests and especially since 1921 by Kahn's precipitin test. Generally speaking the various agglutination tests are dependable. Of the multitude of color tests for renal permeability the phthalein test of Rowntree and Geraghty (1912) appears to be by far the most dependable and practicable. The Fahraeus sedimentation test of the blood (1918) does not make a universal appeal. The blood count diagnosis of infection, etc., introduced by Arneth in 1904, has gone on to almost universal use although at one time it seemed in danger. The method of typing blood, which goes back to Landsteiner in 1904, has come into general use in transfusion.

The subject of clinical and laboratory diagnosis is by no means exhausted in the preceding outline but owing to the instability of the average diagnostic criterion enough may have been said under this head for the present. To take up in turn the innovations of treatment is to pass to a most heterogeneous collection of data. A distinction must first be made between medicine and surgery, and as under diagnosis between the innovation with a sound rational base and the fad. Progress in treatment can hardly be followed up unless we select certain of the great social maladies as a guide. Suppose we take syphilis. At the beginning of the century we had only mercury and iodide of potassium, while at the present time we employ the organic arsenicals and bismuth, still retaining mercury, and in place of oral we resort largely to the injection treatment. This innovation goes back to the work of Ehrlich in 1910, who at the same time introduced the conception of an internal chemotherapy such as might in time be made to sterilize the organism from any disease germ. It can hardly be claimed that this principle is yet in general use for it has held good only in a few maladies.

This effort of Ehrlich was succeeded in 1917 by the successful application of the fever or malarial treatment of metasyphilis by Wagner-Jauregg, who has succeeded not only in curing this late phase of syphilis but at the same time in curing a form of organic insanity. It is unfortunate that the microbic causes of other severe maladies are not equally sensitive to new drugs, but it has always been apparent that despite its possibilities for evil syphilis has always been peculiarly amenable to treatment. In the case of leprosy it has been possible during the present century to cure certain individuals in the early stages by a combination of therapeutic measures including certain drugs. But when we consider that there are probably 3,000,000 lepers in the world the few who have been cured and freed from isolation are insignificant. The improvement in recent years in the status of yaws is due to the fact that like syphilis this disease is peculiarly susceptible to drug treatment.

In the case of tuberculosis drug treatment is still lacking. Only hygiene prevails in phthisis proper, while in the surgical form the addition of sunlight by Rollier in 1903 has confirmed the belief that the malady can be affected only in the most indirect manner, by building up resistance.

In the case of cancer no medical remedy has come to

the fore, the lead treatment of Blair Bell (1922) being in reality an accessory to röntgenotherapy, to be taken up later. Many attempts have been made to influence cancer favorably by diet, chemotherapy, proteinotherapy and other methods of internal treatment but without success save in rare or questionable cases.

The conquest of African sleeping sickness, a trypanosome disease, by the specific synthetic drug known as Bayer 205 is mentioned by Singer but ignored by Garrison, the date assigned being 1920. In this connection may be mentioned the efficacy of emetine and antimonial preparations in a number of exotic maladies.

Among chronic maladies the greatest advances have been seen in diabetes and rachitis, the former through the fasting treatment of Allen (1914), followed in 1922 by the sensational discovery of insulin. In regard to rickets both the theory and practice are in a transitional period, new discoveries and theories succeeding one another rapidly. The use of ultraviolet rays, food irradiated with the same, irradiated cholesterol and ergosterol are among the new remedies which have been shown to have the power of arresting and preventing the disease.

If in place of improvements in the treatment of individual diseases we take up the evolution of new methods of general treatment we face the disadvantage of extravagant claims, marked differences of opinion and commercial exploitation. Irradiation in the widest sense of the term, including röntgen rays, ultraviolet rays, radium, etc., is practically a problem of the present century. The deep or penetrating *x*-rays were introduced by Perthes in 1903 and the first requisite was to prevent the patient from suffering collateral injury and also to protect the operator and his assistants. Some of these dangers were a form of anemia, sexual sterilization, burns and cancer. Aside from the fact that röntgen rays and radium are equal or superior to the knife in certain forms of cancer, it may be asserted that there are very few diseases in which irradiation can accomplish startling results unaided but that it is of great value as an accessory in numerous affections. This is also the most that can be said of all other methods of physical therapy including medical diathermy and ordinary high frequency, thermotherapy, etc. Recently medical diathermy has been highly recommended in the prevention of postoperative shock and pneumonia. The entire subject of physical therapy is in process of revision upward, of rationalization, and the exclusive use of one method is frowned on, as is also any attempt to claim cures of organic disease.

In regard to strictly internal remedies the subject of dietotherapy has undergone notable development during the present century, and so great has been its success in certain conditions that a dietetic treatment of a large number of maladies of all kinds has become either indispensable or of great value. Beginning about 1921 it has been found possible to control the seizures of a large proportion of epileptics by a diet which produces acidosis. The high calory feeding of certain typhoid fever patients is of service in shortening the period of convalescence. The fasting regimen of Allen in diabetes has already been mentioned. A diet rich in alkali formers and correspondingly poor in acid formers has recently been tested by Sansum and others of California, and is well suited for diseases characterized by acidosis. Results in high blood pressure appear to have been unusually good. In regard to minimum food requirement Garrison condemns the efforts of Fletcher as conducive to constipation and autointoxication, but long ago Adolf Schmidt, the gastroenterologist, made the claim that a perfectly utilisable diet could only cause a constipation which is quite within physiological limits. The subject of diet naturally shades into that of deficiency diseases and vitamines which have already been covered sufficiently; also to some extent into the use of foods which contain incretions. The most striking advance in diet therapy is the use of liver substance and extracts in pernicious anemia by Minot and Murphy (1926), which up to date has been used throughout the world with but a small percentage of failure.

The internal use of drugs and other principles by ingestion is a subject which it is difficult to correlate with progress. A few have shown themselves indispensable, as luminal in epilepsy. Useful anodynes, hypnotics, sedatives and antipyretics have been obtained by purposive synthesis. The attempts often made to give vaccines and antibodies by the mouth to avoid the risk of anaphylaxis are of interest and may lead to something of permanent value. But most of the new remedies are given by intramuscular or intravenous injection for their action by the mouth is either wanting or outside of accurate control. These methods which have revolutionized practice are very largely developments of the new century.

Chemotherapy and organotherapy have already been summarized. In regard to serotherapy and the other forms of immunotherapy the subject has shaded of recent years into that of non-specific protein therapy. Doubts have arisen as to whether benefit in this or that case has been due to specific or non-specific protein activity. To formulate any advances in the latter realm is impossible. We know that exceptionally an injection of foreign protein of any sort, including the specific sera, will produce an improvement and even an arrest of some infectious disease, but any attempt to harness this unknown force for routine use is defeated in advance.

In regard to new specific sera, these have been devised in very recent years for scarlet fever and erysipelas, the former by the Dicks and others in 1924 and the latter by Birkhaug in 1926. The first-named appears to exert a specific action, yet sera from other strains of streptococci, which can hardly be specific, may behave in similar fashion. The erysipelas antitoxin appears to have given results somewhat conflicting. Generally speaking, the chief advances in the therapeutic use of antibodies have been in the domain of prevention.

Although duodenal tubage and lavage have been spoken of as non-surgical drainage of the gall ducts and are practiced by gastro-enterologists, this new resource, already mentioned under diagnosis, is best regarded as itself surgical, as much so as intervention by natural passages in the upper urinary tract.

The anti-allergic cabinet or chamber containing absolutely pure air has recently been used with success in allergic respiratory diseases (pertussis, asthma, hay fever) by a group of Dutch physicians.

Under progress in surgery we may first mention wounds, their complications and treatment. The ambrine treatment of burns was actually introduced before the outbreak of the World War—Barthe, 1913—but the war did much to make it known. In 1915 the Carrel-Dakin solution was first introduced and has proved of lasting benefit in wound treatment, incidentally marking a return to antiseptic methods after a period of aseptic management. All military wounds were regarded as potentially septic. By 1917 wound excision as exemplifying the same conception had come into general use in lacerated wounds. Since the war new antiseptics have come into general use, as mercurochrome (1921) and Pregl's iodine solution (1921).

Many new forms of analgesia have come into general use during the present century. The employment of the

scopolamine-morphine anesthesia orginally introduced into obstetrical practice by Krönig and Gauss in 1903 has been extended to some extent into operative surgery. Crile's combination method known as anoci-association dates back to 1901 and involves the use of gas-oxygen. Gwathmey, beginning 1913, has made many contributions to general anesthesia, introducing new anesthetics and combinations of the same. His so-called synergistic method was perfected in 1922 and he has made use of such dissimilar substances as rectal ether, morphia and magnesium sulphate. Novocain was introduced as a substitute for cocain in local anesthesia in 1905 and was first used for blocking in 1913, and stovain spinal analgesia was introduced in 1904-5. Various methods of infiltration analgesia in which quinine, urethan and other drugs and even plain water are employed have come into familiar use during the century.

In the province of operative surgery, both civil and military, the advances have been commensurate with those in other departments. In regard to new methods, surgery of the thorax has been greatly aided by the use of apparatus to equalize the air pressure and prevent collapse of the lung on opening the chest. Sauerbruch introduced his pneumatic cabinet in 1904 and various others followed, but as far as America is concerned it was learned in 1909 that the Meltzer-Auer apparatus for intratracheal insufflation accomplished the same result without the use of bulky and costly apparatus.

In the operative approach the recent substitution of the electrical knife for the ordinary cutting instrument, by Wyeth, has been hailed as the "new surgery," and the dangers of hemorrhage, infection and metastasis are believed to be much lessened. The "electrotherm" was designed primarily for the removal of superficial cancer but its field is doubtless much broader. Sterilization of the operative field with iodine as a routine measure is credited to Grossich several years before the great war.

Many devices for the prevention and minimization of shock and other post-operative complications have been introduced or popularized during the century, such as the Fowler position, the Murphy drip, infusion of glucose solution, adrenalin injections, diathermy of the lower thorax, etc. In this connection we may mention the emergency use of the pulmotor and similar apparatus in asphyxiation, although this resource does not belong under surgery. Blood transfusion is both a post-operative and a non-surgical resource and has come into extraordinary vogue with its endless technical modifications, blood typing, groups of blood donors, etc.

Plastic surgery with emphasis on the cosmetic aspect received a great impetus during the war, although cosmetic facial surgery has also developed in an autonomous fashion. Maxillo-facial surgery, which underwent a notable extension during and after the war, is essentially an outgrowth of the dental or oral surgery of the past century. Cineplastic amputation with resulting improved prosthesis was advanced during the war by Vanghetti (1916) and later by Sauerbruch and others.

Among many advances in skeletal and orthopedic surgery, in which departments Americans have furnished their quota, may be mentioned especially Albee's bone-graft surgery of the spine for Pott's disease, 1911 and after; and Abbott's method of treating lateral curvature during the same period. Bone-grafting was advanced notably by Murphy, who also made numerous contributions to arthroplasty. Lexer also made valuable contributions to plastic surgery of the bones and joints during the war, and in 1917 Willems formulated rules for early mobilization in joint injuries.

Under surgery of the blood vessels may be be mentioned the aneurysmorrhaphy (1902) of Matas, Trendelenburg's removal of an embolus from the pulmonary artery (1908), the work of Carrel—alluded to—in the technic of vascular suture (triangular suture), and pioneer work on the heart by Tuffier in 1920 and Cutter in 1926 in the direction of removal of stenosis of the orifices. Ordinary suture of the heart for incised wounds, first undertaken late in the last century by Rehn, has now become a familiar procedure.

Among the innovations in abdominal and gastro-intestinal surgery may be mentioned appendicostomy (Weir) and Finney's gastroduodenostomy, both introduced in 1902, high enterostomy for drainage in intestinal toxemia, the operation for total colectomy as proposed and executed by Lane, the work of Downs and Bolling in hypertrophic stenosis of the pylorus, and the fixation of the indications for operating on gastric and duodenal ulcer, in which the Mayos and Moynihan were the pioneers. This list is far from exhaustive.

Neurological surgery has made unusual strides during the present century, the greatest advances in intracranial surgery having come from the Johns Hopkins clinic through Cushing and later Dandy and their associates. The work deals especially with brain tumors, diseases of the hypophysis, hemorrhages, hydrocephalus, etc. Spinal cord surgery has received similar care, especially at the hands of Elsberg, whose results appear in his monograph, 1925. Surgery of the peripheral nerves, including total or partial section of the posterior roots for very painful affections, has been carried out especially by Frazier and Foerster, Frazier having begun his surgical treatment of neuralgia in 1901, while Foerster applied this resource in locomotor ataxia in 1909. Of great significance during recent years is sympathectomy —cervical sympathetic—for angina pectoris, ramisectomy for spastic paralysis, and periarterial sympathectomy for certain affections of the extremities (Raynaud's disease). The precise value of this work and whether it constitutes a real advance are open to dispute, for both the theory and results have been challenged; but there is no doubt that such operations may give great relief for the time being.

Among other subjects which remain for discussion should be mentioned preventive medicine, social medicine, medical education and medical history. Despite the enormous importance of these subjects but little space remains available and we can do little more than record some of the high spots. Preventive medicine is a function of government and is most in evidence in epidemics, destructive endemics, warfare, etc. Immunization against typhoid was carried out extensively in the U. S. Army during the mobilization on the Mexican front and later in all armies during the World War, when similar campaigns were waged against dysentery and cholera. Typhus fever was combated at the same time by delousing. The anti-mosquito campaign against malaria and yellow fever was carried out in Panama and elsewhere by Gorgas with great success. Smallpox was stamped out during the century in the U. S. colonial possessions by vaccination and the campaign against the hookworm has succeeded in the Southern States. State institutes for the development of preventive medicine have sprung up in great numbers as well as others backed by private means.

The number of widespread afflictions which have been the aim of preventive campaigns, in which private efforts chiefly function, is very large, comprising tuberculosis, cancer, leprosy, goiter, heart disease, rheumatism, venereal diseases, the crippled, the blind and near blind, etc. Here also belong such subjects as drug addition, infant mortality, birth control, etc. The League of

Nations functions as a sort of international clearing house of world hygiene and at its Health Convention in 1926 covered a wide range of subjects. The U. S. Public Health Service, which dates from 1902, has been directed against all forms of disease, not omitting those due to the industries and occupations in general. Special efforts are being directed by the local governments to antagonize the apathy and fatalism of the Eastern countries, where the severest epidemics originate.

In regard to medical education, the present century has recorded a remarkable elevation of the standards of admission and graduation, with elimination of unfit schools and further reduction of the number by mergers. Education has been made more clinical and practical and the faculties have been augmented by full time professors, and by visiting and exchange professors. Great medical centers have come into existence and it is probable that the United States now leads the world in medical instruction, although this is due in part to the devastating effects of the World War on the European culture states.

Medical history has shown a great awakening, and in common with history in general is being rewritten on a documentary basis in which all records with indirect significance receive due attention. Tradition and propaganda, contemporaneous and subsequent, are eliminated. Thus town and military archives are mostly silent as to a pandemic of syphilis in 1495, the former showing no record of any unusual requisition for poor relief; the "siege of Naples" was only a march of occupation; while many data have come to light which show that the "French disease" was known and feared and treated with mercury many decades before 1495. At the same time it is not impossible that the voyagers to the New World were responsible for a superinfection with the disease.

A most significant fact is the recent establishment of a library in Baltimore for the major purpose of digesting the enormous amount of historical and contemporary literature in such a manner that the work of investigators shall not be continually duplicated. The present day investigator will then be able to build on the work of his predecessors with a great salvage of time and effort.

Backache in Women*

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Current medical literature is apt to lead the casual reader into serious error concerning the question of backache in women. Even in magazines devoted to gynecology, the orthopedic surgeon is claiming that all backaches are orthopedic in origin and none are, strictly speaking, gynecologic. He states that even those backaches which are cured after gynecologic treatment were cured, not because the cause was removed, but solely because the woman was able to assume a correct posture. While some gynecologists are converted to the orthopedic dictum, there are others who are just as radical in their views as the orthopedists.

The trouble is, that the orthopedists are speaking of orthopedic backache, solely; and the gynecologists are speaking of gynecologic backache, solely: two different and distinct conditions.

The truth is that backache is simply a symptom which may be due to many varied causes. All backache does not come into the realm of either the orthopedist or gynecologist. The causes are so many and varied that they should be grouped into some convenient classification so that no one cause is likely to be overlooked in studying a patient. The physician who simply regards backache as a condition to be cured, is apt to be led into the error of applying treatment for the relief of the pain instead of removing the cause.

Any good working classification of causes will suffice. In my own practice I have adopted the following:

a. Those due to focal infection.
b. Those due to diseases of the viscera.
c. Neurologic causes.
d. Orthopedic causes.
e. Gynecologic causes.

The relationship between focal infection and joint and muscle pain is too well proven to require discussion. Just as focal infection is the cause of changes in joints, muscles and fascia, which produce pain in other parts of the body, so does it produce the same changes in the back to cause backache. Focal infection need not cause changes in the structures of the back, and yet may be the primary cause of the symptom. For instance: the focal infection may be in the tonsil and the lesion causing the symptom may be a secondary ureteral stricture or a pyelitis.

The backache may be due to diseases of the viscera such as gall-bladder disease or a retro-cecal appendix with an immobile cecum. The cause is frequently found in the urinary tract and the importance of urologic studies should not be lost sight of in attempting to make a diagnosis of the condition.

In a recent series of urologic studies on patients in whom the dominant symptom was backache, the lesions found included: strictures of the ureters, displaced kidneys with torsion of the ureter, stones in the kidney pelvis and ureters, hydronephrosis, and in one patient, gallstones and kidney stones. One of these patients had four operations, two on the gall-bladder, one for the removal of the appendix and one pelvic. She also wore special shoes for flat feet and a special corset for posture, but it was not until she had a urologic examination and her ureteral stricture dilated, to establish drainage, that she obtained any relief.

Many backaches are the result of some neurologic condition. Many cord conditions will suggest themselves to the reader.

There is a multitude of orthopedic causes responsible for lumbar and sacro-illiac pain. They can be found all the way from flat feet to the base of the skull. Simply because they cover such an extensive range does not mean that the entire field of backache belongs to the orthopedist, and that every case should be treated by corrective appliances or orthopedic operations. Many of the causes are entirely orthopedic and are best treated by orthopedic measures. On the other hand, it must be remembered that many orthopedic cases had their origin in such conditions as focal infections, visceral disease, pelvic disease and neurologic states, and unless the primary cause is removed, the treatment is apt to result in failure. Just as important, it should be remembered that the primary cause may have produced orthopedic

* Read at a meeting of the Clinical Club of the Women's Medical College at Philadelphia.

complications, and even if the primary cause is removed, failure will follow unless proper orthopedic measures are instituted.

As a gynecologist, I suppose, it is expected of me to lay particular stress on gynecologic backache. That there is such an entity as a gynecologic backache I am convinced. That many backaches are cured only as a secondary result after the correction of a pelvic lesion is no doubt true. Patients do assume faulty positions as a result of painful pelvic lesions, and as a result suffer from fatigue backache. In many of these cases the backache is not cured after operation or treatment until they are made to assume a correct posture by orthopedic assistance. On the other hand, there is a still greater number of patients who have sacral backache, and I wish to emphasize the word sacral, in whom the cause is entirely pelvic. One need only read the masterly analysis of Dr. Frank Lynch, of San Francisco, or of George Gray Ward, of New York, to be convinced of the truth of this statement.

It is not good logic to argue that just because a large fibroid of the uterus frequently does not cause backache, that a simple retrodisplacement of the uterus cannot. Many retrodisplacements, of course, do not cause backache or any other symptoms, and there is no excuse for operating on a woman just because she has a displacement. On the other hand, displacements of the uterus do at times cause backache as well as other symptoms and demand appropriate treatment. Another lesion which is a frequent cause of backache is cervical infection. This lesion produces the symptom in one of two ways, either as a point of focal infection or as a cause of pelvic congestion. There are two ways of treating an infected cervix: the first and best, the cautery; the second, a Sturmdorf operation.

Lacerations of the pelvic floor with relaxation of the vagina are also a frequent cause of backache. There are many other pelvic lesions such as tumors, and gross pelvic pathology, in which backache plays only a small part in the general symptomatology. We are speaking here only of patients in whom backache is the dominant symptom. In these cases, no matter what the lesion may be, unless pelvic congestion is present, there is no backache. If pelvic congestion is present then there is backache and the only logical thing to do is to correct the thing that is causing the congestion. When these conditions are corrected then the backache is cured without further treatment of any kind. Both Lynch and Ward in two separate studies found, for instance: that 85 per cent of sacral backache was cured after operations for retrodisplacements, where this lesion was the only cause found after a careful study to eliminate other causes. In only 15 per cent of cases was it found necessary to use orthopedic measures in addition to the operation. Equally as good results were obtained after the correction of other pelvic pathology.

What is the solution of this most common and perplexing problem? First: to remember that backache is only a symptom that is due to a great variety of causes. Secondly: do not be led astray by the enthusiastic specialist, no matter in what he specializes. Backache belongs to no one specialist. Thirdly and most important: bearing in mind the many causes, take a real history. No case can be properly examined and studied with any hope of a full and correct diagnosis in the absence of a good history. When the cause or causes are found, then, and then only, can the case be intelligently treated. In the diagnosis and the treatment, the knowledge of one or more specialties may be needed.

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Spinal Anæsthesia

The birth of spinal anæsthesia occurred some thirty years ago when Prof. Bier, of Kiel, published the results of some experiments in which, for surgical purposes, he had introduced cocaine into the spinal canal. The method was sufficiently startling in its results to attract considerable attention. Tuffier in France became interested, as did a number of surgeons scattered throughout the world. Soon, however, unpleasant concomitant and after-effects were observed to occur distressingly often, nor could their appearance be prevented by any precautions in technique. Spinal anæsthesia was abandoned except by a few enthusiastic workers who held strongly the conviction that in principle it was sound and must be capable of further development. Much of the difficulty lay in the fact that cocaine is a very toxic agent. When less dangerous drugs such as tropacocaine and stovaine became availabale interest in spinal anæsthesia was renewed. In this country valuable investigations were made in 1907 by A. E. Barker, who was able to bring forward a series of cases where the advantages of lumbar anæsthsia were manifest. Barker demonstrated first how a heavy anæsthetic solution could be made to assume that position in the spinal canal which was necessary so that the anæsthesia might spread to the upper abdomen. Jonnesco in 1909, by high injections, extended its use to operations upon the thorax, head, and neck. But because the physiology of the procedure was not well understood accidents still occurred which marred the brilliancy of the successful results, and led once more to a diminution of interest in the method. Hence until quite recently spinal anæesthia occupied a very small place in the technique of most modern operating clinics, and when used at all it was reserved for operations upon the lower limbs. In the early stages of the war it was hoped that spinal anæsthesia would be of great assistance in combating the shock of serious wounds of the lower extremities, but soon it was asserted that shock was a contra-indication and another check to its popularity occurred.

It is really only since the war that attention has again been directed to the method particularly in connection with the growing popularity of novocaine which is the least toxic of all known local anæsthetics. Knowledge of the mode of action has accumulated, and a technique based on the use of novocaine, with the precautions which we have learnt to respect, has resulted in a striking diminution in the incidence of untoward accidents. On page 271 of this issue we publish a Hunterian lecture by Prof. C. A. Pannett which deals with the use of spinal anæsthesia for operations upon the upper abdomen. Whilst for this purpose it is not so implicitly reliable as inhalation anæsthesia, it does promise very great advantages to the patient. It seems probable that before long spinal anæsthesia will be made as afficient and safe as general anæsthesia is to-day. The dreaded fall of blood pressure is not so much to be feared now that the mechanism of its production is known and that measures can be taken to combat it; the risk of permanent paralysis is negligible if novocaine be used and puncture takes place below the level of the cord; ocular paralyses are transient and have become progressively rarer; even the severe headache following operation is much less frequent with the modern technique, where a very fine needle is used for the injection. Inhalation anæsthesia, moreover, is not without its inconveniences. The patients who are given spinal injections are at least free from post-operative disturbances, are more comfortable in the days immediately following operation, and are immune from the late often very serious sequelæ associated with general anæsthesia. Intensive study designed towards the elaboration of a more perfect technique of spinal anæsthesia for general application is being pursued in America, where surgeons are seeking escape from the disadvantages of ether narcosis. Particularly valuable work has been done by G. P. Pitkin and F. C. McCormack and H. Koster. This last observer has applied the technique to the whole body so that operations upon the head, neck, and upper limbs can be performed as freely as upon the lower extremities. In this he has followed Le Filliâtre, who nine years ago advocated general spinal anæsthesia with cocaine. It was Le Filliâtre who first introduced the method of reducing cerebro-spinal pressure before injection by removing definite volumes of cerebro-spinal fluid. His methods are drastic, consisting of the removal of 25—30 c.cm. of fluid and the forcible injection through a needle of large bore of 2.5 to 3 c.cm. of a 2 per cent solution of cocaine hydrochloride. He was recently able *La Press Médicale*, 1928, xxxvi., 1320. to report nearly 10,000 cases with only two deaths, though it must be admitted that few surgeons have been so successful and free from accident.

The development of anæsthesia by the spinal route is likely to be important. It should be emphasised, however, that caution is necessary and that inexperienced persons should study the story of failures as well as the list of successes before plunging into the spinal canal a needle of large bore filled with a highly toxic preparation. It would be unfortunate if for the third time a very valuable procedure should fall into disrepute.—*The Lancet*, Feb. 9, 1929.

Gonorrhea: Historical Notes*

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This disease is by no means a recent discovery. In the fifteenth chapter of Leviticus we find it first appearing under the caption the "Running Issue of the Flesh" (about 1471 B. C.). Thus ever since Moses led his flock out of the wilderness we find the human race afflicted with this sequala of unclean sexual relations. Morris believes that although there are no means by which we can positively identify gonorrhea in the early ages, it is almost certain the disease can be traced back to the earliest records of the human race. In its march through the generations it has certainly left in its wake a blind, halt, maimed, sterile and sexless multitude. An old Japanese print written in 900 B. C. is said by Proksch to contain an accurate description of gonorrhea.

The Scythians, according to Herodotus, about 484 B. C. conducted an expedition to Ascalon, a city of Syria, where they despoiled the temple of Venus Urana, following which they were attacked by gonorrhea.

In 300 B. C. Hippocrates called the disease strangury because of the painful urination accompanying it. He believed the discharge was caused by the presence of tubercles or fleshy masses in the urethra, and that the said flow was nature's attempt to clear the pipe. Morton tells us that Aristotle, Plato and Seneca speak of gonorrhea in their writings, and it is well known that Epicurus committed suicide as a result of its complications. This revered person felt that his life was becoming a burden incident to his sufferings with stricture and subsequent difficulty in urination.

To Galen, A. D. 130, we owe the name gonorrhea, as he believed it was an involuntary loss of semen. In this he was greatly mistaken, but as one of the examples of our loose etymological usage it has held to the present day. Morgagni, one of the most distinguished of the earlier medical investigators, proved the error of Galen's view by showing that the disease originated in the mucus membrane of the urethra and not in the seminal vesicles or seed sacs. The common word clap owes its origin to the section of Paris known in the middle ages as Clapier, in which the prostitutes were domiciled.

Along about A. D. 1162 we find the Bishop of Winchester and other prelates issuing edicts to prevent the spread of the disease. In the Sicilies, where the infection was rampant, we find Queen Joanna, A. D. 1343, ordering inspections by physicians of the public places and the isolation of those diseased. Sanger says many were driven into the fields to die. He further tells us that the nobles and clergy claimed their infections were due to other causes than sexual and many theories were advanced. Here we undoubtedly have the origin of the toilet anecdote still extensively used. In A. D. 1430 we find Henry IV banishing all the venereals from the public hospitals, but in the reign of Henry VIII isolation hospitals were established for the care of these patients. Say what you may of bluff King Hal, he realized the necessity for treating this scourge.

Previous to the appearance of syphilis in Europe, gonorrhea was held to be a separate and distinct disease. In the fifteenth century syphilis appeared and spread rapidly over Europe as an epidemic. It attracted so much attention that gonorrhea became somewhat neglected, all venereal diseases being confused and regarded as different manifestations of the same malady. This period of confusion lasted over two hundred years and would have cleared up sooner but for the unfortunate and misleading experiment of John Hunter, A. D. 1767, one of the most distinguished medical men of his day. In order to settle the doubt as to the unity of gonorrhea and syphilis, Hunter inoculated himself with pus from the urethra of a patient. In the course of time he developed secondary syphilis, ulcers of the tonsils and a copper-colored pustular eruption on the skin. Hunter was a little bit quick on the trigger or too ready to jump at conclusions, promptly inferring that gonorrheal pus had caused syphilis. All discharges from the urethra are not gonorrheal and at times are due to a syphilitic sore. This happened in Hunter's case and his infection was a truly syphilitic one.

In spite of this unfortunate and misleading experiment there were a few physicians, notably Benjamin Bell, A. D. 1793, who maintained gonorrhea and syphilis were distinct diseases. The Germans also came to the conclusion about this time that gonorrhea and syphilis were distinct entities but regarded both as systemic diseases. Autheuriet, A. D. 1809, Ritter, A. D. 1819, and Eiseman, A. D. 1830, record convincing evidence of this fact. The effect of Hunter's error really lasted until A. D. 1831, when Philippe Ricord drove home to the physicians the results of his experiments. This distinguished Frenchman made 667 inoculations and showed conclusively that gonorrhea and syphilis were different diseases. Ricord's knowledge of the real causative factor in gonorrhea was uncertain and he believed that the inflammation in the urethra of the male was brought about by various indefinite causes.

Up to A. D. 1872, strange as it may seem, very little serious consideration was given to gonorrhea in women. At this time Emil Noeggerath, a German physician, published his epoch-making contribution. His ideas were revolutionary, particularly as regards the infection of women. He called attention to sterility and puerperal sepsis after infection. Noeggerath was fortunate in living to see many of his ideas confirmed. He also suspected a bacterial origin of the disease. It was not, however, until the dawn of modern bacteriology, notably the introduction of Koch's methods, that the real cause was determined.

To Albert Neisser of Breslau, Germany, we owe the discovery of the gonococcus, the exciting factor. This occurred between 1879 and 1882. His observations were soon confirmed by other investigators and this organism was definitely conceded to be the cause of gonorrhea. In 1884 Bumm cultivated the gonococcus in pure culture and added much to our information. He also studied the changes in the tissues caused by the invading bacteria. This was chiefly noted in the structures of the eyelids and vicinity in babies suffering from infection of those parts acquired at birth. Finger of Vienna (1905) gave us the first real studies of the action of the gonococcus in the genital organs.

This is but a brief historical sketch of what truly constitutes one of the world's greatest plagues.

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Arsenic As a Problem in Present Day Public Health Management*

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The deleterious effect of poisonous plants and potions was recognized by prehistoric men but these early problems on arsenic centered about homicidal applications. Their efforts centered about endeavors as to how best to make their weapons more poisonous and thus make wounds more fatal. This was accomplished by means of smearing darts and arrows with poisonous pastes, thereby inflicting early death upon the unfortunate victim. The effect was mysterious; the mystery led to a veil of superstition to which was ascribed supernatural power. The artisans, as they were called, commanded the respect of all, and inspired fear in the heart and mind of all who were associated with them.

Through this means poison-lore was transmitted to historic man and thus into the literature of primeval learned people. Poison was the political engine of early intrigue, nor has this entirely disappeared from our present day living in that the intrigue and the intriguers have developed along more specialized methods. A cursory glance at the early sacred writings of the Far East will show that the art of poisoning was used for the purpose of suicide, revenge and robbery. In contrast to our highly specialized gunmen, early civilization had its professional poisoners who in a large measure were used by royalty to remove individuals who became obstacles in their greed for power and domain. Early Grecian literature contributes at least three references to this highly specialized mode of removing human obstacles. Apollodorus (300 B. C.), Nicander of Colophon (204 B. C.), and Dioscorides (A. D. 40) perpetuated this poison-lore through their literary writings. During these early years arsenic was administered more or less skilfully by mouth. The same may be said at the present time, except that the intent now differs distinctly from that of early man. In order to produce these desired results, *food, drink,* and *medication* were the usual modes of administration. With our more scientific development, these same routes are associated with the problem of health of our present day.

Unusual emphasis is placed at this time on this statement, that "*substances that are extremely poisonous under some conditions* are useful and important remedies under other conditions." As a well-known pharmacologist once said, "Arsenic has the common lot of all powerful drugs, that it is now praised, now blamed," and as its dynamic efficacy in the organism cannot easily be reached by any other drug, and still less surpassed, one cannot be surprised that it is decried—especially by those physicians who fight shy of all power in a drug—while it is always appropriately esteemed by those who understand how to make use of such an important power. That arsenic was the most terrible poison under all circumstances was the general opinion of the former, and they expressed this without considering that no absolute poison could exist, and that it is precisely these potent poisons which are our most powerful weapons. Therefore, if any one wishes to realize the curative power of arsenic, then he must adhere solely to what observation of the healthy and diseased organism has taught us, and must entirely forget all statements made by important men from a preconceived idea.

This leads us to consider the definition of a poison. Some substances are extremely poisonous under certain conditions, and under others they are important remedial agents. In the definition of poison in its relation to public health it is necessary to express both the quality and the degree of the action resulting from the ingestion of the deleterious substances. Old English law defines a poison as a destructive substance administered to, or taken by, a person; and includes not only substances which act on account of their inherent chemical and other properties after ingestion and absorption into the blood, but also mechanical irritants, and specifically tainted fluids. In detail, a destructive agent includes substances gaseous, liquid, solid, living, or dead, which may injure or destroy life. Huseman and Kobert present two other definitions which should be given consideration. Huseman: "We define poisons as such inorganic or organic substances as are in part capable of artificial preparation, in part existing, ready formed, in the animal or vegetable kingdom, which without being able to reproduce themselves through the chemical nature of their molecules under certain conditions, change in the healthy organism the form, and general relationship of the organic parts, and through annihilation of organs, or destruction of their functions, injure health, or under certain conditions, destroy life."

Kobert adds: "Poisons are organic or inorganic, unorganized substances originally in the organism itself, or introduced into the organism, either artificially prepared, or ready formed in nature, which through their chemical properties, under certain conditions, so influence the organs of living beings, that the health of these beings is seriously influenced *temporarily* or *permanently*."

In accord with our views, arsenic, lead, copper, possibly zinc and aluminum constitute a menace as a result of our present day artificial mode of living. Hippocrates in the period of Grecian achievement swore that arsenic should never be in the hands of the general public, but from a clinical point of view, its effect is seen in the hands and on the hands of a large number of patients as a result of the ingestion of foods and drugs contaminated through careless exposure.

The subject of arsenic has had a peculiar fascination from a historical point of view. Early alchemists looked upon orpiment as the key to the Philosophers' Stone. Through this means, its discussion has found its way into the literary achievements. The writings of Hippocrates, Pliny, Celsus, and other Grecian and Latin manuscripts found in the National Library at Paris, as well as Chaucer's Canterbury Tales, contain references to this subject.

It is interesting to note an editorial comment of the *British Medical Journal* in which it is stated that of the elements known to the ancients few have a more interesting history than arsenic. The earliest record of it dates back to a period of about 400 B. C., although it is probable that it was known in India, China, and the Far East long before it came to the knowledge of the Greeks. Arsenic in the form of the native sulphides

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(orpiment—As_2S_3, and realgar—As_2S_2) was found both in Greece and Hungary. Hippocrates mentions the use of realgar as an external remedy for ulcers and other complaints, and orpiment is alluded to by Dioscorides as a remedial agent.

Orpiment, perhaps because of its bright golden color, seems to have exercised a certain fascination on the early alchemists, who looked on it as the key to the Philosophers' Stone. It attracted the attention of the Arab chemists at an early period, and is mentioned first by Thases and afterwards by Jabir-Ihn-Hayyan (Geber). To him is attributed the discovery of arsenious acid, which he obtained by roasting the trisulphide, and he called it "white arsenic," the name it still bears. He apparently knew also of metallic arsenic, and that under certain conditions white arsenic would deposit a silvery mirror on bright copper. The discovery of its poisonous action was probably made soon afterwards. The danger arising from its use was well known in the fourteenth century, as is evident from a statute passed at Sienna in 1365, which enacted that red arsenic sulphide and corrosive sublimate could only be sold by the principal or the director of a pharmacy, nor were these substances to be handed to any slave, whether freed or otherwise, nor to any servant, nor to children, nor to any youth under 20 years of age, but only to adults who were well known.

Arsenic as a Poison

The first direct evidence of its use for criminal purposes is in an official record of the trial of a minstrel named Wondreton in Paris, in 1384. It contains a copy of the instructions alleged to have been given to him by Charles the Bad, King of Navarre, who employed him to poison Charles VI of France, his brother, two uncles, and others of the nobility at the court:

"Wondreton was instructed to buy arsenic sublimate from certain apothecaries in the cities through which he would pass on his journey. He was to get into the kitchens of the residences of the persons against whose lives he was plotting, and was to sprinkle some of the powdered arsenic in the soup and other food served to the masters. According to the chronicle 'Wondreton was arrested before he killed anyone.'"

The word "arsenic" was first used in the English language in the fourteenth century. In a MS. "De Proprietatibus Rerum," 1389, Bartholomew Glanville alludes to "Arsenicum hyghte Auripigmentum for the color of golde and is gadereyd in Pontus." It is mentioned by Chaucer in the Canterbury Tales:

"It nedeth not to reherce hem all
Waters rubyfyeing, and boles gall
Arsneko, sal ammonyake, and brimstone
And herbes coulde I tell eke many one."

In 1567 Maplet alludes to "the stone Arsenick . . . which also they call the golden earth," and in an edition of the Salerno Regimen (1634), mention is made of "Auripigmentum, which some Arsenicke call."

That the poisonous properties of arsenic had become well known in the sixteenth century may be gathered from the name "ratsbane," by which it was popularly known. Davenant, in his *Wits* (1672), makes one of the characters say, "Arsenick my Girl to strengthen thy Aunt's broth," and in 1675, in *Notes from Ringcross,* mention is made of "putting white Arsenick into her broth."

As a lethal agent arsenic has probably figured more largely in history than any other poison; many deaths may, however, have been attributed to it by the imagination of the chronicler. Thus Catherine de'Medici is said to have attempted to poison Henry of Navarre by moistening the leaves of a book he was intending to read with a solution of arsenious acid. But the book, so the story goes, fell into the hands of her own son Charles IX, who, moistening the pages with his fingers in turning over the leaves, became affected. He ordered the volume to be thrown on the fire. Whilst it was burning Ambroise Paré, then court surgeon, entered the room and exclaimed, "Who has been burning arsenic here?" "I have," replied the King.

An epidemic of poisoning ran through France from the end of the seventeenth to the early part of the Eighteenth century to such an extent that the "Chambre Ardente" was appointed to take drastic steps to stop it. Then and since arsenic has been a favorite instrument of the poisoner.

Orpiment, known in the seventeenth century as yellow sulphuret of arsenic or auripigmentum, became official in sixteen of the pharmacopoeias of Europe; it formed the principal ingredient in Lanfranc's collyrium, a preparation which for nearly two centuries enjoyed great popularity as an application to ulcers. Another preparation used for the external treatment of ulcers and cancer was Frère Come's paste: it was composed of red suphuret of mercury, arsenious acid, the ashes of a burnt shoe sole, and dragon's blood. Orpiment was known also as Rousselot's arsenical powder, and formed the principal ingredient of Hellmund's ointment or cancer cure, the formula for which was purchased by the Prussian Government for a large sum so that it might be made known to the public.

The bibliography of arsenic and its preparations as therapeutic agents is considerable, and Waring records no fewer than 112 books dealing with this subject alone. One of the first was Castelli's account of arsenic, published in Rome in 1619. In 1686 Donzellus, in his *Formulae,* mentions that arsenic was employed as an amulet against plague, and a small piece placed in a little bag was carried by many to ward off infection during the great plague of London.

Not apparently until the early eighteenth century was it found that boiling arsenious acid with an alkali rendered it more soluble in water, and this marked an epoch in the internal administration of the drug. Numerous formulae began to be published at this time, the best known of these being Jacob's, Brera's and Hein's solutions. These were superseded by the solution originated by Dr. Thomas Fowler, which came into general use and was officially included in the London, Dublin and Edinburgh pharmacopoeias. Fowler added the compound spirit of lavender to the formula, not for flavoring, as is generally supposed, but merely on account of its color, so as to give it "a medicinal appearance, lest patients entrusted to drop it for themselves might be tempted to use it with too much freedom."

In the consideration of arsenic in respect to our present day problems, the relation of the normal value to those found under certain conditions must receive adequate attention. In 1899 Gautier presented this subject to the French Academy. Much speculation was made on the subject and many observers, attempting to confirm these results, resorted to the fallacious argument that if *arsenic* were a normal constituent of the body, there could be no exception, and therefore, its presence in the cases in which it is found must be adventitious. Later, Fordyce, Rosen, and Myers in their studies on Syphilis from a Clinical and Biological point of view, state that:

"The fact that arsenic, by whatever channel absorbed, causes tissue changes (and the symptoms resulting therefrom fairly warrant the inference that it enters into chemical reaction with the constituents of these tissues), and if it disappears therefrom sooner than it does from the liver and other parenchymatous organs it is because the form of combination is less stable in one case as compared with the former. Upon this basis the use of

arsenicals rests upon distinct physical, chemical and dynamic fundamentals as applied to the therapeutic treatment of disease. Based upon the above conception, it immediately becomes evident that an active and inactive variety of arsenic should exist in that the amount that is eliminated so rapidly had little or no opportunity to produce any sterilizing effects and that the amount left is so small that it may be a cause for many Wassermann-fast cases.

"As early as 1839 arsenic was detected in the blood drawn from the veins of the human subject in life, whereas Seidel (1882) reported that arsenic is found in the corpuscles but not in the plasma. In the light of our present knowledge slightly different views are held.

"In a succeeding paper absorption, elimination, retention and the normal values will be discussed for the reason that each of these subjects needs considerable elaboration. It is quite necessary to make a few of these preliminary remarks that it may be clear that this subject is not new, that the methods of elimination are being rediscovered, and that the analytic procedures are not unusual or novel."

The investigations of Gautier and the importance of these results must not be overlooked. Following his report to the French Academy, a committee of that body examined the existing results and arrived at a conclusion as follows:

"Speaking from a medicolegal point of view, I would state that arsenic, aside from the thyroid, mammary and thymus glands, never occurs in the human body except in the skin, hair, bones, milk and sometimes in the feces and then only in traces which are often infinitesimal. Excepting the brain, the other organs and fluids, especially those forming the bulk of the body, as muscular tissue, liver, spleen, kidneys, lungs, blood, urine, etc., fail to show the slightest trace of arsenic. . . . If a chemist therefore examines individually these arsenic-free organs by my method or by one less delicate and finds traces, especially appreciable traces, of this metalloid, such arsenic has been absorbed during life either medicinally or criminally."

In discussing this point in relation to normal arsenic, it is important to give the editorial comment from the *Journal of the American Medical Association,* Vol. 81, No. 6, page 478, August 11, 1923:

"Somewhat less than a quarter of a century ago, the French chemist Gautier aroused considerable discussion in scientific circles by his communication to the Academie des Sciences of Paris on the occurrence of arsenic in the body. He asserted that this element is a normal and consistent constituent of the thyroid, mammary glands, brain, thymus, hair, skin, milk and bones of man and various animals. The quantities involved were very small, being at most less than 0.75 mg. for each hundred grams of tissue. The content of the blood was almost infinitesimally small, not exceeding one part in fifty millions. Gautier's statements were confirmed in a general way by a number of French chemists, but the quantities recorded by them were decidedly smaller.

"Previous to this time the chief interest in the possible presence of arsenic in human tissues lay in its medicolegal bearings. This substance was at one time an exceedingly 'popular' poison, so that it figured prominently in many trials for murder. The fatal dose is comparatively small; but since the methods of detection are very delicate, it has usually not been difficult to establish the presence of even minute amounts of arsenic postmortem in the organs when the use of the substance has resulted in death. The finding of quantities approximating a lethal dose was the most important evidence that a prosecutor was wont to gather. Great stress was therefore laid on the use of arsenic-free materials for embalming; and the chemist needed to be doubly cautious with respect to the purity of all chemicals used in his toxicologic analyses.

"It is easy to appreciate, therefore, how disconcerting was the report, by a scientist of international repute, regarding the existence of 'normal arsenic' in the body, even though the quantity was small at best. There was, however, another aspect of possibly large significance attached to Gautier's comments. In 1895, only a short time before the French communications were made, Baumann announced the discovery of small quantities of iodin as a normal constituent of the body, localized in the thyroid gland. With the rapid demonstration of the great physiologic significance of a few milligrams of a formerly unsuspected tissue component, it was a natural consequence that attention should be directed to the possible biologic importance of traces of other elements. Copper and manganese were early taken into consideration, because of their widespread distribution in nature; and at this juncture came the announcement about arsenic.

"The assumption that arsenic plays a part, as does iodin, in the functioning of certain tissues will be clearly negatived if it can be demonstrated that the former element is not a constituent of these tissues. This is the outstanding problem of the physiologist. It does not concern the toxicologic expert, to whom it is immaterial whether minute quantities of arsenic in the body are normal or of fortuitous origin, so long as they are of a magnitude too small to have medicolegal significance. Of late, a new interest has been developed by the growing use of arsenicals in human therapy. The problem of their action and distribution will be greatly confused if the drug administered is superimposed on quantities of arsenic, however small, which have an extraneous origin or a 'normal' function. This has been clearly recognized by Fordyce and his co-worker at Columbia University College of Physicians and Surgeons, as well as others, in their studies of arsenic as a remedial agent. An examination of the blood, urine, hair and milk from about 200 persons has led to the conservatively made statement that arsenic is found 'normally' in a large number of persons, depending on the character of their food, drink, medication and environment. Under conditions of restricted diet, it may be entirely absent. Some persons do not give a positive test at all times. Recent chemical investigations show to some extent that all sorts of drugs and foods may be contributing factors in the detection of arsenic in human beings, the outcome depending on the methods of manufacture and the preparation of the foods. Arsenic is almost invariably present, in varying amounts, in persons applying remedies containing ingredients contaminated with it to inflamed or ulcerating skin surfaces, and to a greater extent in persons receiving the element either by mouth, or intravenously, or connected with arsenicals in a preparative way. At any rate, the latest analytic data, including such simple, every-day items as rhubarb and soda, sulphur ointment and sulpho-ichthyolate preparations as well as foods, in the list of 'carriers' of arsenic, show that a careful history of the patient is requisite before arriving at a final decision regarding the meaning of the arsenic content of the blood, urine or even the organs."

The studies of Myers and his associates have given adequate reference to the literature on the subject of arsenic. The bibliography accompanying these publications presents references to the literature. In reaching a broad point of view in regard to this subject, the experiences in England should receive adequate consideration. The British laws in regard to arsenic are undoubtedly more stringent than those of any other nation. They have been brought about through the experiences of time in which arsenic has exacted its toll of unfortunate accidents. Experience as a rule proves a severe taskmaster, consequently the alertness of the scientists in watching for the devastating manifestations of the element. Gautier and Clausman in 1903 estimated that each inhabitant of Paris consumed at least 7.66 milligrams of metallic arsenic per annum. This was in the period of promiscuous spraying with insecticides. In the light of these figures one would scarcely venture a guess in regard to the present Volstead dodgers. During the spraying season in Spring and Summer, interest and curiosity have directed our attention to the workmen in the orchards and vineyards with their high-powered sprays going up and down the rows of fruit. In 1900 there appeared a serious outbreak of arsenic poisoning in England. The results of this outbreak are found in the reports by Hehner, Reynolds and the Royal Commission. In the case of beer, the arsenuria can without doubt be attributed to the glucose employed in the beer fermentation. Putnam, in 1890, examined a group of such patients in and around Boston at the Massachusetts General Hospital and he states that these patients did not present any symptoms which seemed referable to arsenic poisoning but they were certainly not healthy, and there is no assurance that they had not been exposed to arsenical contamination. Abel and Battenberg, in 1899, writing in Germany, state that "people in America deal carelessly with arsenic." It seems that almost three decades ago, foreign observers saw the present public health aspect of our population and certainly with our present artificial modes of living and carelessness in the use of contaminated products, the condition has not improved tremendously. In the Putnam group, thirty per cent of the cases showed arsenic in the urine. Hills examined 260 samples from 180 patients and arsenic was

present in 135 or 75 per cent of the specimens. In many of these cases the origin of the arsenic was traceable to arsenical content in the wall hangings. Hills suggested that the general use of Paris green as an insecticide may have produced an arsenical impregnation of the soil in certain localities, from which growing vegetables might be contaminated. More will be said in this connection.

In 1922 Barber suggested the use of arsenic as a larvicide for anopheline larvae, and as late as November, 1927, Griffitts expresses regret that Paris green as an anopheline larvicide has not found application in the destruction of larvae which feed below the surface or at the bottom. Criticism in regard to the very excellent control of the malarial situation can not be offered insofar as this applies to the anopheles, but unfortunately all public health measures are not dependent on the anopheles. Experiment No. 10426 in this investigation serves very well to illustrate the point in mind in that it was near an oyster shucking plant. Oyster shucking plants as a rule are not too remote from oyster beds. The experiment further shows that *in three hours* 98 *per cent* of the larvae were dead. In other words, the arsenic was dissolved in order to destroy the larvae. In his discussion it is shown that this application is lethal to subsurface mosquito larvae. It requires but little thought to realize that this arsenic solution gradually works its way out to the deeper waters. Barber and Komp, in 1927, compared larvicides, and apparently thought grossly in terms of toxicity for the reason that the area was invaded by cattle and mules and no untoward effects were noted. This is perfectly *correct* since as pointed out elsewhere arsenic has been used to improve the appearance of the coat of animals. It is also true that purchasers of horses are equally reticent in purchasing such animals because they become poor risks after the temporary tonic action has worn off. It is these small amounts and the late effect about which there is concern. Along this same line of attack attention is called to the Chemical Warfare Service Boll Weevil Investigation by Walker and Wells (1927). Using the Tumbler tests they mention 14 class *a* compounds, and 24 class *b* compounds containing arsenic. They point out that some of the effectiveness of calcium arsenate is due to the replacement of some of the AsO_4 radical by carbon dioxide, thus liberating water-soluble arsenic. They calculate that 0.00204 mg. arsenic, using calcium arsenate, is the average arsenic found in weevils poisoned. Many illuminating photographs have appeared in popular magazines showing the airplane mode of dusting. September 23, 1927, a committee of malariologists deposited two pounds of Paris green per acre, and noted its rapid action on anopheles with approximately a 100 per cent lethal effect in 22 hours. This shows the rapidity of solution of the arsenic preparation.

With these results in mind it is interesting to turn to the results of Chapman, 1926, on the presence of compounds of arsenic in marine crustaceans and shellfish. Preceding this report A. J. Jones, in 1922, in the Year Book of Pharmacy, p. 388, states that in the case of 11 varieties of marine algae they contained arsenic to the extent of 6 to 125 parts per million when expressed as arsenious oxide. Medicinal seaweed preparation contained 1 to 90 parts per million. These results have been confirmed. In 1902 Bertrand pointed out that arsenic was present in some kinds of fish. About 1923 the Swedish Government investigated the general question of poisoning by arsenic and found larger amounts of arsenic in fish, thereby confirming the findings of Bertrand. The finding of *arsenic* in fish and sea food is to be expected, due to the continuous contact with arsenic-containing water. From a forensic point of view Sillig, in 1920, showed the importance of arsenic in soils, vegetables, animal substances; and marine algae. Endemic arsenicism has been noted in the province of Cordova, in which there is an area in which both the ground and the water contain sufficient metal to cause occasional symptoms of chronic intoxication both in man and in animals. These results have been confirmed by Zincy and Vivaldo. More recently Corbella showed that this area extends as far as the northeastern part of the province of Buenos Aires. These suggestions from unbiased sources indicate the necessity for careful consideration in the destruction of enemies common to other hosts. It indicates a necessity for cooperation between the entomologist, the toxicologist and the clinician. It is difficult to state which is more distressing, malaria or arsenic eczema, a large crop of cotton or a systemic disturbance in the human, large perfect leaves of tobacco or smaller insect-eaten leaves without disease. The analogy may be extended but the point must be clear that a definite thought must be given to the dangers involved.

In making such sweeping recommendations governmental agencies should proceed with caution. A careful survey of the presence of arsenic and the prevalence of its deleterious action on health deserves the consideration of investigators thinking from widely divergent points of view. The promiscuous spraying of arsenic insecticides in the form of powder or solution should be prohibited from the point of view of general health. If an epidemic of typhoid occurs the milk and water supplies are condemned, and confiscation results. How many more cases of metallic poison occur unnoticed, and uncared for?

Having directed our attention to the spreading of arsenic over land and water it is interesting to note the findings of Chapman, in 1926, concerning the presence of arsenic in marine crustaceans and shellfish. Examination of 11 varieties of marine algae by Jones in the *Year Book of Pharmacy*, 1922, page 388, reveals the fact that amounts of arsenic expressed as arsenious oxide varied from 6 to 125 parts per million. This refers particularly to Irish moss. Examination of five samples of British oysters shows arsenic present in all specimens, the amount varying between 3 and 10 parts per million. The values are in terms of wet substance. Escallops varied between 36 and 85 parts per million (wet); mussels between 36 and 119 parts (wet); cockles 17 and 40 parts; whelks 12 and 40; lobster 36 and 40, whereas specimen 5 showed as high as 110 parts per million; Norway lobster 29 to 100 parts; prawns 36 to 174; shrimp 12 to 40 parts; crabs 36 to 70 parts. Three parts per million is equivalent to 1/48 grain of As_2O_3 per pound. Thus in the case of prawns there is present 1.2 grain per pound.

Chapman examined 16 samples of sea water with an average of 0.33 parts per million or approximately 1/40 grain per gallon. Russian caviare contained 5 parts per million. To show further the importance of these findings the same authors studied the ingestion of these lobsters by human subjects. It was definitely shown that the increase of arsenic in the urine for the 12 hours following the consumption of the lobster was 85 times that of the normal value per gallon, still further increasing during the next 24 hours to 136 times the normal value. These values are mentioned by us for the good reason that it is a well-known observation that some individuals are unable to eat fish and other crustaceans without gastric disturbances as well as pruritus. It has been our policy to avoid the use of fish as much as possible in the diet of our skin patients. This furthermore should dissipate the mirage that has appeared in the

minds of some that it is impossible for arsenic to reach the human economy, and if it does, no harm can result. The famous beer cases of 1900 have always served to keep the English observers ever alert to the public health menace.

Cox, in 1925, further enhanced our knowledge of the subject by showing that patients fed on a fish diet excrete far more arsenic per liter than average hospital cases. In 1922 an interesting situation arose in England in relation to cocoa. Arsenic in cocoa surely is one of the most unexpected sources, yet the Home and Colonial Stores were selling cocoa which contained one-fortieth of a grain of arsenious oxide per pound. Rowntree sold a similar product with one-tenth of a grain per pound. The arsenic was traced to the potassium carbonate used for the purpose of rendering the cocoa soluble. Baking powders, egg powders, and self-raising flours need consideration due to the use of impure acid phosphate. Analyses have shown 10 parts per million in egg powders and 6.6 parts in baking powder. Self-raising flour contained quantities varying from 0.2 to 2 parts per million. The British Royal Commission has recommended 1/100 of a grain of arsenic per gallon, and per pound. This amounts to 1.43 parts per million. Baking powder with as much as 1/18 grain of arsenic per pound has been found. There is a temptation on the part of manufacturers to use inferior and possibly contaminated materials, thus requiring the vigilance of those who guard our food and drug supplies.

Two cases of illness resulting from eating Pfefferkuchen made with potassium carbonate have been reported. This is closely associated with the English cases. Potash is used in the Dutch process of cocoa manufacture, thus directing our attention to chocolate products. This is important in its relation to children who eat large quantities of chocolate cookies and chocolate products.

In 1921 Cazeneuve reported a fatal outbreak of arsenic poisoning as a result of insecticide. There were *fifteen* deaths which occurred promptly. Severe peripheral neuritis and acute arsenic symptoms appeared in the non-fatal cases. The poisoning was presumed to have resulted from drinking water into which a soluble arsenic insecticide had found its way. Each glass and a half contained more than a grain of the salt. The law of 1916 in France forbids the use of soluble arsenicals in agriculture and this episode called forth the efforts of the Academy of Medicine to prevent a recurrence of this laxity. Occiphral was the highly toxic arsenical insecticide employed in the vineyards where this series of fatal cases was observed. Sir William Willcox, in 1922, read a paper before the section of Industrial Diseases expanding on the sources of danger due to arsenic. The author states that there has been a large increase in the number of cases of arsenic poisoning since 1908 and he attributes this to the ease with which arsenic is obtained, and its wide use for agricultural and horticultural purposes. The use of arsenic in weed killers finds extensive application in England and has given rise to accidental as well as criminal poisoning. A sack of sugar absorbed a quantity of the poison from a leaky tin in railroad transit; about 60 cases resulted but no deaths. In the case of Rex *vs.* Bingham, 1911, three fatal cases of arsenical poisoning were the subject of inquiry and these cases were undoubtedly due to liquid weed killer. In May, 1921, Eureka Weed killer was responsible for the death of a woman. In 1920 and 1921 two additional fatalities from this source were reported. Arsenical wood preservatives are another source of poisoning. Men who do the spraying suffer with "sores on the hands." Arsenical sheep dips should also receive consideration. Numerous cases of poisoning, *accidental* and criminal, have been reported. Fly papers, fly killing solutions, rat paste, ant destroyer, and arsenical soaps and pastes used by taxidermists are other sources mentioned by Willcox. One case in particular is cited which is of special interest to the dermatologist. In 1916 a cask of sodium arsenite intended for destroying flies lost its label, and some of it was added to the drinking water in mistake for alum. On August 20 and 21 a soldier suffered from severe diarrhea and vomiting. On September 16 the patient had a rapid pulse (112) with some cyanosis. There was a marked wasting of the muscles of the hands, feet, forearms, and legs. There was peeling of the skin of the hands and feet and some thickening of the skin of the palms and the soles. The conjunctivae were also infected. The case is of unusual interest since it shows the rapid development of a severe neuritis and skin lesions. Willcox further reports the unfortunate results of fruit-tree sprays with severe illness and in one case of fatal result. In the first case the patient had suffered for seven years with an erythematous rash on the hands. His occupation was that of a market gardener. He suffered with swollen eyes, thickening of the nails, tenderness of finger tips, erythema and swelling of face and neck, and exfoliation of face, neck, and ears with some brown pigmentation. Death from chronic arsenic poison occurred about eight years after exposure. Arsenic was present in the urine. It is pointed out that persons who have had no proper training in the uses and dangers of these products can not appreciate the effect on health. Circular 659 (England), dealing with the sale of Foods and Drugs, states that amounts of arsenic up to one-tenth grain per pound have been found in apples and infers that recently there were cases of illness traceable to the consumption of such apples.

A great deal has been written during the past three years in regard to the apples shipped from America to England. Very considerable losses have been experienced by shipping fruit to England that exceeds the tolerated limit. Canadian apples are also found to contain 1/190 of a grain (AS_2O_3) per pound. The work of Cox shows that arsenic is not normal to apples. However, the use of a very poisonous substance in the growth and preparation of potential food products introduces grave risks to public welfare. The medicinal dose of arsenic is 1/64 to 1/16 grain and reports show the presence of 1/30 to 1/15 grain per pound of apples. From every angle the presence of arsenic or lead on fruit should be discouraged and prevented.

Since the great arsenic beer scare of 1900 in which glucose was directly associated, it has not been surprising to find other sources of contamination. G. D. Elsdon in 1924 examined 51 wrappers of proprietary breads and found arsenic in nine of them. On the basis of these findings Barry, in 1927, published his results on arsenic in *Printers' Ink*. The blue, purple, and green wrappers seemed to show the presence of more arsenic. Many of these papers are used in wrapping confectionery and it is wisely suggested that arsenic-free colors shall be used. From these results it should be pointed out that as new methods of packing, treating and distributing food products are developed, new sources of arsenic as well as of other poisonous substances should be guarded against.

W. J. O'Donovan reported three cases of occupational arsenical cancer seen at the London Hospital. O'Donovan quotes from the *Pharmacologia* of John Ayrton Paris, fourth edition, 1820: "It may, however, be interesting and useful to record an account of the pernicious influence of arsenic fumes upon organized beings as I have been able to ascertain in the copper smelting

works and tin-burning houses of Cornwall. This influence is very apparent in the conditions of both animals and vegetables of the vicinity; horses and cows commonly lose their hoofs, and the latter are often to be seen in the neighboring pastures crawling on their knees and not infrequently suffering from a cancerous affection of their rumps. . . . It deserves notice that the smelters are occasionally affected with a cancerous disease of the scrotum similar to that which infests chimney-sweepers." This is the earliest reference to the relation of occupational contact with arsenic, as a causative agent in dermatological conditions, that we have seen.

Of particular interest in regard to arsenic in human environment is the investigation of Remington dealing with tobacco. The results of this study show that arsenic is present in American smoking and plug tobacco to the extent of six to thirty parts per million, equivalent to 1/20 to about ¼ grain of arsenic trioxid per pound. These amounts exceed the maximum limits of most food and drug laws. The arsenic is volatile in the smoke. In our studies on arsenic eczema exacerbation of the condition can be produced by some brands of cigarettes.

Among the most recent causes arsenical intoxication is noted in connection with fruits such as apples, pears, grapes, peaches, and cherries. These fruits are sprayed with insecticide containing casein, which is used as a binder. When the casein dries it is difficult to remove the insecticide.

Through the vigilance of the British government large quantities of apples were seized and confiscated. The amount of arsenic present exceeded the British limit of one-one hundredth of a grain per pound. Why such a limit has been chosen has not been ascertained by us. As a result of several thousand cases it has been observed by us that a little arsenic is just as bad as a little more. It has been our experience to find many wipers of fruit among the commission men to be suffering with all the symptoms of a chronic arsenic poisoning. The fruit growing industry is advised that proper measures of protection will be used and this of course temporarily appeases the producer till the time for marketing the crop. The Department of Agriculture has obtained at least two court decisions in regard to contaminated fruit in spite of the fact that another Bureau has recommended its use.

It is our contention that arsenic even in smaller amounts than the legal tolerance is a menace to public health and that from a regulative point of view the limit set is absurd. Our analyses, extending as late as 1927, show amounts of arsenic up to 1/25 grain of arsenic per pound. Other evaluations show amounts ranging from zero to 1/10 grain per pound of apples. Cherries and peaches have shown amounts of arsenic as follows: cherries 1/40, 1/80, 1/200 grain, peaches from N. Y. State 1/150, 1/200, and 1/600 grain per pound. Grapes without any doubt contain arsenic in large amounts but in our work analyses have not been carried out.

In the early part of this paper allusion was made to the effect of dusting the population with calcium arsenate. Cotton from four different localities was obtained and the following amounts were obtained: 0.0973, 0.578, 0.903, 0.109 milligrams of arsenic per 100 grams of specimen. Finished cotton goods have shown 0.085-0.076 milligrams of arsenic per 100 grams of dry material. It is therefore apparent that the arsenic is carried along during the process of manufacture. Very frequently workers appear in our Clinic suffering with typical arsenic symptoms.

For the first time in 1916 an unusual source of poisoning was reported in which an outbreak of hydrogen arsenid poisoning occurred in British submarines. Examination of the blood of three men sent to the Naval Hospital at Chatham gave no evidence of carbon monoxide poisoning. The patients were jaundiced and showed a profound anemia. In the first voyage the onset of the symptoms appeared generally on the third and fourth day. On the second trip the symptoms were more pronounced and started on the first or second day. The number and severity of the illnesses forced one boat to return at the end of four days. Twenty men out of the twenty-six on board vomited within twenty minutes after the opening of the boat. Proof of the illness was obtained by finding hydrogen arsenid in the air, and by recovery of arsenic in the urine and hair of the victims. The origin was finally traced to an alloy in the battery grids of the affected boats. The amount of arsenic increased as the batteries got older. The two symptoms most complained of were vomiting and dyspepsia, burning and griping abdominal pains were also noted. In all there were 30 cases reported in which jaundice was a constant sign; headache, peripheral neuritis and cramps were frequently noted. Arsenic was found in hair, urine and nails.

Confirming these findings, two cases of submarine workers have come to our attention in which arsenic has been found as the causative factor. These men suffered with a chronic arsenic poisoning in which skin manifestations were the external predominating symptoms. These symptoms fall into our group of metallic eczemas previously described by us. A short course of treatment with freshly prepared sodium thiosulphate has completely cleared these conditions. These patients stated that many other members of the submarine crew suffered with similar symptoms, showing that this is a common condition. To illustrate the amount of gas that may be liberated, the following data are illuminating: a submarine may have 150 batteries, each battery weighing approximately 2,200 lbs., and the men sleep over the batteries, thereby breathing the arsenic which is liberated as a gas.

Another very common source of arsenic contamination is through the newspapers, particularly the Sunday newspaper with its highly colored rotogravure section. In this connection a report is made of a newsdealer who distributed the Sunday papers and during the early part of each week a relapse occurred. Treatment and keeping away from this work readily cleared up the condition. The widespread reading of papers only emphasized the prevalence of this dermatitis. To corroborate these findings it is interesting to refer to the investigation of Barry, in 1927, dealing with the presence of arsenic in printing ink. In 1924 Elsdon examined 51 wrappers of proprietary breads in England and found arsenic in nine of them. This investigation of Barry shows that the printing ink is the source of the arsenic. Moist, sticky confectionery is also frequently wrapped with this kind of paper and its examination should be most stringent. Barry believes that no pigment containing more than one part in 20,000 should be used at all. Barry mentions that the day may not be far distant when the poisoner will kill his victim by carefully chosen diet.

The presence of arsenic in glycerol is a very common source of contamination as a result of the use of impure mineral acids in the hydrolysis of fats. As early as 1908 Goldschmidt observed its presence in glycerol and its detection is described in the Austrian and German Pharmacopœias. Amounts as much as 16 parts As_2O_3 per million were found. More recently Utz, in 1921, showed that 0.10 to 0.15 mg. arsenic per liter could be present. Little consideration is necessary to understand the wide-

spread use of glycerol in drugs. It can be a common source of irritation and absorption when applied to the skin, especially if it is abraded. The presence of arsenic in tartar emetic, sodium sulphate, bismuth subnitrate, calamine lotion, ichthyol, glucose, and a variety of other drugs, demands the consideration of the clinician, particularly when the results do not seem satisfactory.

Returning now to the question of foods, gelatin and glucose are the most common articles that should always be held under suspicion. Gelatin is used extensively as a filler in a variety of desserts and yet it is a common source of contamination, amounts being found up to 10 parts per million. Glucose is a substance extensively used in baby foods, delicatessen products, in syrups used in preparing canned fruits, and in syrups at the soda water fountain. One need only observe the growth of the sales of soda fountain and delicatessen products to realize the widespread possibility of contamination.

The careless use of insecticides and their containers is well illustrated by a series of cases of arsenic poisoning occurring in the Blue Ridge section at a home for aged men of a fraternal organization. It was reported that there were 30 cases of definite poisoning, and three deaths. This came about through the use of a cask which had been used for a solution of insecticide. It was alleged that the cask had been thoroughly soaked with water following its use for insecticide. However, it was used for sweet cider and its contents sold with the unfortunate results briefly related above.

Vegetables such as celery, lettuce, tomatoes (canned and fresh), potatoes and cabbage need to be included in this discussion. The results of Bertrand check up rather closely with the present day conditions:

ARSENIC IN VARIOUS VEGETABLE AND FOOD SUBSTANCES

	As, p.p.m.	Reported by		As, p.p.m.	Reported by
Peas	0.04	Bertrand	Beef (muscle)	0.006	Bertrand
Carrots	.05	Bertrand	Veal	.001	Bertrand
Apples	.05	Bertrand	Mackerel	.025	Bertrand
Mushrooms	.06	Bertrand	Grumet (fish)	.06	Bertrand
Pears	.07	Bertrand	Eggs	.08	Bertrand
Rice	.07	Bertrand	Corn stalks	.04	Jadin and Astruc
Potatoes	.08	Bertrand	Corn kernels	.3	Jadin and Astruc
Cauliflower	.08	Bertrand	Dried peas	.26	Jadin and Astruc
Spinach	.09	Bertrand	Dried fruits		
White bean	.10	Bertrand	(sulfur		
Cabbage	.20	Bertrand	bleached)	0.2-2.0	Collins
Lettuce	.23	Bertrand	Vegetables	0.2	Bang
			Fish	3.	Cox

Standard textbooks on dermatology state that arsenic can cause a large variety of lesions on the skin, and also that it is used for a very great variety of diseases without any distinct physiological reasons. These lesions can vary from a simple erythema to hemorrhagic and gangrenous processes. Nerve disturbances have been known for a long time. In our work arsenic has been found associated with and in all probability as the cause of the following conditions:

Eczema:—In this condition it is believed that arsenic is the cause of at least 35 per cent of all cases observed. The symptoms suggesting an arsenical causation are seen chiefly on the hands or feet. On the palmar surfaces of these parts and also on the fingers there is seen hyperkeratosis. This hyperkeratosis can be either diffuse or punctate; in the diffuse type the whole epidermis is thickened, hard and like leather. The skin is reddened, pruritic and has a marked tendency to split, causing painful fissures. This condition may be limited to the palms or it may be present also on the flexor surfaces of the fingers. In the punctate type of keratotic condition is seen small, warty-like growths. These keratoses are especially seen on the sides of the fingers away from points of pressure. The tips of the fingers are characteristic; the skin here is coarse-grained and dry, the epidermis peels continually, the skin loses its elasticity and on pressure suggests an old, dry piece of rubber tubing. The nails are rough, pitted, distorted, at times thickened and discolored, the nail substance is dry, breaks easily, and the nail bed is thickened and rough at its free margin. Occasionally, instead of showing the above changes the nail is white, the so-called leuconychia. The whole nail may show this white color or there may be present white bands extending across the nails, leuconychia striata. This condition is not seen frequently. It was seen in a man who had received injections of neoarsphenamine and in a child who had been given an arsenic tonic after an attack of diphtheria. This child also showed a tylosis of the palms and soles. The general symptoms of eczema, vesicle formation, papules, edema of the skin, oozing and crusting are the same as are seen in cases of this condition not due to arsenic. On the other hand, patches of a dry psoriatic-like eruption on the extensor surfaces of the forearms below the elbows, and on the dorsal surfaces of the fingers and hands, are very suggestive of arsenical retention.

Psoriasis:—This condition is almost universally treated with heavy metals either externally or internally. Arsenic is used more than any other drug. Its retention in this condition is shown by the lesions becoming more inflammatory, spreading into large sheets or plaques, and especially by the condition developing on the palms and at times on the soles. The nails also become involved. The lesions on the palms may be red, circumscribed scaly patches resembling the psoriatic lesions on the other parts of the body, or these lesions may become confluent. These lesions begin as reddened, slightly infiltrated, smooth, shiny macules which soon become scaly. Keratoses such as described above under eczema are seen fairly frequently. The nails are pitted at first and later they become rough, thickened, distorted, discolored and brittle. The nail bed at the same time is thickened. Occasionally the psoriatic process becomes universal, showing all the symptoms of a universal, exfoliative dermatitis. In this condition the skin is edematous and infiltrated and resembles the condition seen in leucæmia of the skin.

Leucoderma:—Two cases of this condition were seen which showed a raised inflammatory border at the edge of the depigmented area. The urine of one of these patients was examined for arsenic after the administration of sodium thiosulphate. Arsenic was found in pathological amounts. The inflammatory zone cleared up entirely and the spots regained their normal color. Dr. Long, who is associated with us at the New York Skin and Cancer Hospital, told us that he had had two cases of this condition which did not show any inflammatory areola, but in whose urine he found arsenic, and that both of these cases regained the normal color in the white spots after arsenic-eliminating treatment.

Pigmentation:—A case of pemphigus which had received arsenic by intravenous injection showed almost black pigmentation in and around the pemphigus lesions. The bases of many of these lesions showed a papillomatous growth. The old lesions would not heal. Under arsenic-eliminating treatment these symptoms cleared up.

Every case of scleroderma which we have examined showed arsenic in pathological amounts in the urine. Some of these cases showed extensive, widespread lesions, and one had in addition destructive ulceration, which had completely destroyed all functions of one leg; others showed localized lesions of various shapes and sizes; some were irregularly round or oval, others were band-shaped. In this condition the skin becomes shiny, hard, its elasticity is lost, and the color can be ivory white

or it may be deeply pigmented. In the later stages the skin becomes atrophied. It is thin, resembling tissue paper with the blood vessels showing through the thinned skin. Surrounding the lesions a delicate lilac coloration is frequently seen. In all of these cases the arsenical poisoning was acquired either through occupational contact or through food contamination.

Nerve lesions:—A young woman who had partaken of food in which arsenic had been put with homicidal intent showed a motor oculi paralysis of the left eye. Her symptoms were ptosis of the lid of this eye and double vision.

Another case was that of a man about 45 years of age who had been given injections of cacodylate of soda. These injections were followed by a neuritis, and the neuritis was followed by muscular atrophy of the muscles of the legs and forearms and hands.

Several cases showing pigmentation of the skin, resembling the condition called chloasma, were examined. All showed arsenic in their urine after thiosulphate. In some of these cases the pigmentation was a uniform brownish-black discoloration. In one the hair follicles were not involved but were seen as white spots on a dark background.

Discussion—The subject of arsenic could be extended to many other avenues of approach but it is hardly necessary to go into these details. The effect of arsenic on public health is widespread and in many instances the deleterious action goes unrecognized and unassociated with clinical symptoms that appear years after exposure. This subject has not been approached from the alarmist's point of view, nor have its disastrous effects been considered as endemic, but on the other hand it is well known to all of us that many may consume, or be exposed to arsenic, without any by-effects whatever. As pointed out in previous articles, arsenic produces its disastrous results through deposition in cells which have suffered previous damage, or have reached a point where a "fulminator" is sufficient to cause an outbreak.

It is further emphasized by us that arsenic can be the cause of many ills hitherto unrecognized. In spite of the fact that all of us ingest arsenic from some of the sources mentioned above, some of us only show the untoward results weeks, months, and even years after contact. Our researches have endeavored to find out some of the abnormalities clinically and biologically. For instance, in a previous publication it has been suggested that psoriasis of the nails and palms does not exist as an entity, but that it is an arsenical keratosis accompanying the psoriasis. Our proof of this point briefly consists in the removal of the arsenic with a clearing of the palmar symptoms. Arsenic is demonstrated in the blood and urine of these patients. Every clinician has noticed that a fresh scratch in a psoriatic patient results in a new lesion. As pointed out by Müller and one of us arsenic produces cellular damage and is deposited in these areas. The same is noted in palmar and plantar keratoses.

In every instance of a condition cited above, there are several cases at our Clinic in which arsenic has been forensically determined and the clinical condition improved by our course of treatment. The data collected for this study have been selected from a group of approximately 3,500 cases. During the course of this study more than 40,000 blood analyses have been made in order adequately to differentiate this condition.

In our estimation the insecticide angle of this health problem demands the most serious consideration in that it is the most common and widespread source of contamination. It is a short-sighted policy and a retroactive measure to recommend the use of substances as toxic and destructive as lead and arsenic. In the beginning it was ascertained that the combination was effective to some degree in the form of an insecticide and by the same reasoning it should have a toxic action on the human. In the haste to produce practical results which would lead to research with more appropriations, the health point of view was unfortunately not given sufficient consideration. Furthermore, in the period during which these studies were carried out it was not realized that metals may produce an *oligodynamic effect*. Copper in concentrations as small as one part in seventy-seven million has been known and shown scientifically to destroy growing organisms in distilled water within a period of two to four minutes. The same condition is applicable to all the other heavy metals. From a pharmacological point of view, when water is distilled from metal containers or through containers of metal, this water shows peculiar pharmacological action. The only exception to this rule has been noted in the case of pure tin. In an experiment described in "Opinions," by Dr. Charles T. Betts, in which city or well water was boiled in an aluminum dish for one-half hour, it was shown that when this water cooled that a cloudy condition developed in the water. This was found to be aluminum hydroxide. This same situation is applicable to other conditions and was undoubtedly well illustrated in the work of Dr. Frank B. Mallory of Harvard University in his "Studies on Copper," which likewise showed a disturbing action. On the basis of the effect of metals from the oligodynamic point of view, it is our contention that fruits, vegetables and food should be free from metallic contaminations, and the use of insecticides containing copper, lead, or arsenic should be abolished. In studying the effect of these substances the human case shows the results of small amounts of metals, and it is our belief that these relatively small amounts and their influence on the human were first pointed out at the New York Skin and Cancer Hospital.

On reliable information it was estimated that one manufacturer alone sold six million, six hundred thousand pounds of insecticide in 1926. No insecticide of poisonous nature should be used. Pure apples, pears, grapes and peaches are preferable to irreparable damage to health, particularly to children who eat large quantities of these fruits. The promiscuous dusting of cotton and the saturation of water to a lethal point for the destructive effects of larvicides are factors that should be eliminated for the health and happiness of all individuals in all communities. The same thing applies to the use of fish and shell-fish which live in waters highly contaminated with metallic substances. Our appeal, in conclusion, is for the elimination of deleterious substances whether they may be in the air, food, or drink, or in medicinal substances, because the control of present conditions increases the utilization of large amounts of carbohydrates susceptible to these poisons.

In brief, the presence of arsenic in glucose, drugs, lotions, tobacco, foods, fruits, vegetables, larvicides, and especially insecticides, is a distinct menace to our well-being and unless discontinued will lead to a marked menace in diseases of obscure nature, such as eczema, keratosis, peripheral neuritis, disturbances of vision, and neurological symptoms hitherto obscure. Our appeal is for the abolition of the use of lead and arsenic as insecticides and with this an economic saving of many thousands of dollars to the public at large. Give the consumer a chance to be free of disease and save unnecessary expenditure through regulation.

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Public Health

The Prevalence of Syphilis and Gonorrhea

The New York State Department of Health has made a survey to determine the real prevalence of syphilis and gonorrhea on a given date as a basis to estimate the future incidence trend of these diseases. The physicians' willingness to cooperate with the Division of Social Hygiene was the essential factor in the success of the scheme.

The total population of territory covered in this survey was almost 6,000,000. Observations based on populations of this size are but little subject to chance error and the conclusions based on them picture local conditions accurately.

The territory covered was large enough, and population sufficiently varied in density, occupation and racial stock, to represent reasonably accurately the conditions in the northeastern part of the United States.

The report covers 57 counties in a single state thereby reducing the effect from possible intercounty travel to the minimum.

In five counties, Cattaraugus, Hamilton, Putnam, Tompkins and Warren, reports were secured from every physician. In 17 counties with a total of 1,291 registered physicians more than 97 per cent of the questionnaires were completed.

A number of counties representing widely varying conditions which have been thought to influence prevalence rates of syphilis and gonorrhea were studied thoroughly. Nurses supplemented the questionnaire mailed.

Data was obtained from 5,402 sources; divided as follows: 93 per cent. from physicians, 1 per cent. from clinics and 6 per cent. from state hospitals and institutions.

Nearly half (45 per cent.) of the physicians reporting had one or more cases under treatment or observation on the day of the survey. Of those treating, 80 per cent. had cases of syphilis and 75 per cent. had cases of gonorrhea.

Among other results of this survey it has shown that most of the cases are treated by physicians. Although there are more than fifty clinics for indigents at strategic centers, 73 per cent of all cases of syphilis and gonorrhea were treated in private practice; 61 per cent. of syphilis cases and 89 per cent. of the gonorrhea cases. Monroe County had the highest proportion, 53 per cent., of syphilis cases treated at clinics and Cayuga county the highest proportion, 37 per cent., of gonorrhea cases, attending the clinics. A very much higher proportion of the syphilis cases (21 per cent.) than of gonorrhea cases (8 per cent.) were treated in the clinics. On the day of the survey, the cases of syphilis and gonorrhea treated or under observation in private practise, clinics, hospitals and state institutions numbered 25,113; of these 14,476 were cases of syphilis and 10,637 were cases of gonorrhea. This gave a prevalence rate of 4.57 per 1,000 population, 2.63 for syphilis and 1.94 for gonorrhea.

The prevalence rates for males were about the same for syphilis (3.34) and gonorrhea (3.00) whereas for females the syphilis rate (1.93) was more than twice the gonorrhea rate (0.88).

Of the women who were under treatment for syphilis on the day of the survey 44 per cent were attending clinics; more than double the corresponding proportion (21 per cent) under treatment for gonorrhea.

The data available does not warrant definite conclusions regarding the prevalence of syphilis and gonorrhea according to the urban or rural character of the population or accoding to the density of population.

It has given a basis, imperfect perhaps, but of real value for estimating the relative prevalence of syphilis and gonorrhea. The survey has given for the first time information upon which even a rough estimate of the incidence of gonorrhea could be based.

It has made possible the comparison of statistics of New York State with those of cities, counties and states which may make in the future similar studies.

It has proven strikingly that the general practitioner in New York State is treating syphilis and gonorrhea.

It shows that the ten years of organized effort by the Federal Government and the State Division of Social Hygiene has probably resulted in getting thousands of infected persons under scientific treatment.

It has demonstrated that these diseases are sufficienly prevalent to constitute a major problem in preventive medicine.—Albert Pfeiffer, M.D., and Herbert W. Cummings, in *New York State Journal of Medicine.*

Obscure Dental Sepsis

To the onlooker in medicine few things have been more impressive in recent times than the awakening of medical interest in dental and tonsillar sepsis as factors in obscure systemic infection. That there has been a gradual change of attitude on the part of the family medical attendant towards his patients' teeth will scarcely be denied. How many doctors fifteen years ago thought of toxic absorption from a tooth socket when treating a case of sciatica or of unexplained pyrexia? In the early days of enlightenment pyorrhœa alveolaris was thought to be of prime importance; now it is apical sepsis that holds the centre of the stage, and the pulpless tooth—the "filled dead tooth"—is increasingly recognized as a menace to health. Bit by bit the evidence has been sought for, and pieced together, incriminating hidden dental sepsis as (to say the least) a predisposing cause of general disease. The fruits of the pioneer work of Dr. William Hunter have thus in the course of a few years become a commonplace of medical practice. In this advance radiography has been of inestimable value. It is true that there is still a good deal of controversy about the interpretation of the x-ray appearances round he apices of pulpless teeth, and that all dental surgeons are not yet agreed as to the treatment of such teeth; but with improved technique and growing attention to the subject knowledge is accumulating. Fresh light on the problem, leading to something in the nature of standardized procedure, may be expected in the near future if idontologists and radiologists and pathologists continue to work hand in hand; but it is all-important, we think, that physicians and surgeons and general practitioners should regard themselves as essential members of the team. That the ophthalmologist also is concerned in this matter was preached many years ago by Mr. William Lang, who had noted and reflected upon the close connection between some eye infections and dental sepsis; and at the congress last April of the Ophthalmological Society of the United Kingdom Mr. A. F. McCallan, when discussing the ocular changes observed in association with focal sepsis, reported that one in five of a consecutive series of private patients coming merely for refraction were found on radiographical examination to have apical abscesses. In short, as Dr. Patrick Watson-Williams wrote the other day, at the end of his paper on nasal and oral sepsis in the etiology of gastro-intestinal and pulmonary diseases, "in medicine there is but one field, which ever calls for team work."—*Brit. M. J.*, 1928, i, 1036.

Cities Offering Aid to Hard-of-Hearing Children

Twelve cities of the United States have been placed on the honor roll of the American Federation of Organizations for the Hard of Hearing; they test the hearing of school children by audiometer, have special classes to teach speech reading to partly deaf children, and utilize available clinics. One of these cities—Rochester—has an ambulatory clinic especially for treating the school children. Several cities are meeting two requirements, and it is hoped that they will soon complete the third point and be eligible for the honor roll. A number of others are offering instruction in speech reading for the hard of hearing.—*United States Department of Health.*

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Our Temperance Poll

One element in this country regards prohibition as an alien, ill-favored child left as a practical joke upon the doorstep of the American people by the god of war, and views the upbringing of this unwanted and unneeded whelp as perhaps the most sardonically conceived requirement ever put upon a nation once famous for its sense of humor and practical common sense.

Another element regards it as a constructive, noble and highly promising experiment, the success of which is essential to the future greatness of the republic.

Political, moral, economic, industrial and humanistic considerations motivate both groups.

Physicians constitute a special group whose views on this topic are governed or tempered largely by scientific considerations. It is the medical aspects of this national situation that chiefly concern them.

As a ready means of measuring the present opinion of the profession it occured to us that the taking of a temperance poll would be enlightening.

Accordingly, three thousand reply-postcards were distributed in Brooklyn on or about April 12, covering all but 238 of the physicians in that Borough. Brooklyn was selected as affording a typical, nearby section of the American profession, and it seems reasonable to assume that had the entire profession been polled the results would have been much the same, since its scientific standards govern thought everywhere. At the same time we trust that some larger organization than ours will adopt our "hint" and poll larger groups, or perhaps the whole profession.

The following query, to be answered Yes or No, without signature, was printed upon the detachable reply card addressed to this office:

> *Do you favor a Federal campaign for temperance, under the auspices of the United States Public Health Service, as a substitute for prohibition, in the interest of the nation's health?*

As this editorial goes to press, fourteen days having elapsed since the mailing of the postcards with returns still coming in, the results show that nearly one-third of the recipients have responded, in the manner tabulated:

YES	713
NO	115
NOT VOTING for various reasons	14

Nineteen cards were not delivered because of change of address.

It is evident that that part of the medical citizenry which is giving serious thought to this problem and not too conservative or Hamlet-minded to be articulate is overwhelmingly for temperance education as against prohibition enforcement.

The medical profession's expressed judgment in this matter could well be accepted by the nation as a guiding factor in its deliberations and action. That judgment seems to be that temperance education would afford a sane solution to the problem of alcoholism.

The vast experience of the medical profession with alcoholism has presumably made converts of most practitioners to temperance in all things. In the words of Harlow Brooks: "The essential value of temperance in all things is perhaps more vividly illustrated in regard to alcohol than in most other ways, and the abuse of alcohol is as bad certainly as the abuse of nitroglycerine and gun-powder, or of religious dogma."

The medical understanding of temperance with respect to alcohol has been expressed by another great clinician, Osler, who, in 1901, wrote as follows: "With the introduction of light beer there has been not only less intemperance, but a reduction in the number of the cases of organic disease of the heart, liver and stomach caused by alcohol. While temperance in the matter of alcoholic drinks is becoming a characteristic feature of Americans, intemperance in the quantity of food eaten is almost the rule. Adults eat far too much, and physicians are beginning to recognize that the early degenerations, particularly of the arteries and of the kidneys, leading to Bright's disease, which were formerly attributed to alcohol, are due in large part to too much food."

From a public health standpoint, it is to be presumed that most practitioners of dynamic, public-spirited type are convinced that prohibition is doing harm.

There has never been an intensive, authoritative campaign for temperance education in the medical sense. It has never been tried. Yet the United States Public Health Service is charged by statute, under the Constitution, with the duty of "public health education and dissemination of health information."

With the sure passing of the nightmare which grips us now we must be ready for a new day.

In that new day the division of education in the Public Health Service will begin to function with something more than the few wretched thousands now allocated to it. And the truths of hygiene will be taught by it, which is to say as enunciated by Osler and Brooks.

Prohibition and the Public Health

There is increasing bitterness over the prohibition issue throughout the land. It seems to us that the unwholesome emotional state of the populace must have its repercussions upon national health. This emotional state is a continuous one, and the average citizen is ready with his intense reactions at any momen't notice. Not that there is much "shooting" going on. There is intense fanaticism, and there is increasing resentment, but there is no proper outlet for the torrid emotions.

This constant state of bad temper can not be conducive to national health, physical and mental no less than political.

Then add to the foregoing the facts as to alcoholism, the figures concerning which are nothing short of appalling.

During the years from 1920 to 1927, inclusive, the mortality from alcoholism increased 317 per cent in the States continuously in the Registration Area throughout this period. Arrests for drunkenness have increased over 125 per cent. There has been an extraordinary increase in the number of speakeasies. Alcoholic insanity has increased notably. There has been a marked increase in the number of drivers' licenses revoked because of drunkenness. Prohibition-inspired crime has seen a vast increment. In 1921, 9,746 distilleries were seized; in 1928, 16,220. The number of fermenters seized has increased from 70,014 in 1921 to 217,278 in 1928. In 1923, 8,356,695 gallons of mash were seized; in 1928, 26,594,533 gallons. In 1920, 153,735 gallons of liquor were seized; in 1928, 32,401,330 gallons. In 1920, 15,416 pieces of distilling apparatus were seized; in 1928, 261,611 pieces. In 1921, 8,325 gallons of whiskey were exported by Canada to the United States; in 1927, 1,103,239 gallons, including only liquor made in Canada (add thirty per cent more for foreign goods). In 1921, 195,498 gallons of malt liquors were exported by Canada into the United States; in 1928, 3,888,815 gallons. The total appropriations for the Prohibition Unit and the United States Coast Guard have increased from $3,750 in 1920 to $28,970,345.45 in 1928.

What is there ahead so precious that it is worth purchasing at so great a cost?

What greater issues are cunningly sidetracked while the emotional energies of the people are kept blindly operating upon a red herring?

This baiting of the herd seems to us not so safe a political sport, not any too well gauged as regards the intelligence of the herd (which is greater than the politicians and professional moralists fancy), and not a good thing from a public health standpoint.

Mr. Coudert, eminent publicist, sees possibilities of actual civil strife soon if the goaded elements of our population are unable properly to adjust to the mess that has been *brewed*.

There shall be no cakes and ale, but we drink a brew for which Beelzebub must have furnished the recipe.

The Occasional Surgeon

One of the outcomes of progress in smaller communities is the modern hospital, which often harbors a great deal of surgery performed by physicians who dabble in medicine and surgery. After handling all of the infectious diseases, especially scarlet fever, one finds the occasional surgeon performing tonsillectomies, appendectomies, and the like. It would seem that this type of surgeon is a detriment rather than an asset to a community. Surgery should be done by a surgeon who does nothing else; even surgery is divided into various specialties. After a two weeks' course in some clinic, the occasional surgeon will attempt almost any surgical operation. He finds some abnormality in nearly every patient, which he declares must yield to his surgical skill. He operates on gall bladders without ascertaining if the patient is a diabetic or if he has arterial hypertension. He performs tonsillectomy without doing a blood coagulation time. He operates on syphilitics without knowing it. Such is the life of an occasional surgeon. Often the patient does not receive skilled aftercare—one of the most important considerations in surgery. On the other hand, some of the smaller towns have some very able surgeons who would not fit into this classification.—M. W. T.

Birth-Control vs. Self-Control

The public has now become so familiar with contraception through the daily press that it is common talk among the laity.

Having long ago been committed fearlessly to the fixed belief that every honorable physician must settle this vexed question—as well as the more delicate one of "therapeutic" abortion—according to the dictates of his own conscience, we are disposed to examine it from the side of the Roman Catholic Church.

No one can talk intimately with a sincere theologian of this church without being convinced of his firm allegiance to authority, in force for over a thousand years, regarding the sacredness of the marriage tie, which only death can dissolve. This is also the general attitude of the Protestant clergy.

That Rome is progressive and is in sympathy with modern ideas is proved by her wise decision to eliminate the annulment of marriage, for psychological, as well as physical reasons.

One who has sworn the oath of allegiance to the flag feels that the solemn words, "without any mental reservation," might be added to the vow taken often so lightly at the altar. But, when it concerns the question of sexual relations it becomes more difficult. Self-control, the priest insists, is the only legitimate way in which to avoid conception, and this is the attitude of our honored confrères in the church. who carry their religion into practice, setting us heretics a fine example of consistency.

This is, of course, the ideal method, but how many married people are able to adopt it, while humanity remains so weak and fallible? Hence the general advocacy of birth-control among physicians, not for the convenience of women who selfishly seek to avoid the responsibilities of parenthood (preferring puppies to babies), but in the interest of worthy mothers.

We can not regard this as a purely academic question, for our daily experience in the consulting-room proves that it is intensely practical. We are not prepared to settle it under present conditions, for we have not yet grasped the full significance of the sentence pronounced in Faust: *Entsagen sollst du sollst entsagen.*

Not until the learned professions—law, medicine and theology—"get together" on a working basis can we hope to find a satisfactory solution.—H. C. C.

Eye Infections and Diseased Teeth

A great many eye infections clear up with remarkable rapidity after the extraction of a diseased tooth. Some observers believe that a large percentage of eye infections are due to abscessed teeth and it is not always a simple matter to diagnose a diseased tooth since the *x*-ray will not show a devitalized tooth. Many physicians and dentists do not appreciate the fact that a dead tooth can cause obscure symptoms; some believe that it re-

quires an abscess of large size to cause symptoms. Sometimes a small area about the root of a tooth will cause great damage while a large area will often cause no symptoms.—M. W. T.

The Clinical History of Mrs. Eddy

A suit in equity soon to be tried in Boston bids fair to reveal many interesting facts regarding the ailments and medical treatment of the notorious prophetess of Christian Science. According to the sworn statements of certain representatives of the Christian Science Parent Church, which is sponsoring the said suit in equity against the so-called "Mother Church," Mrs. Eddy was attended at various times by physicians and was a morphine addict. Her morphine was administered hypodermically by certain persons in her entourage, and it is presumable that skill in this type of medication was an indispensable accomplishment on the part of these courtiers.

In these days of strict narcotic control such a life would be hedged with greater difficulties, and its pretenses subject to more certain exposure.

What irony there is in these revelations in the Massachusetts court! What a sordid tale is here! Shielded for years in Concord behind a veil of mystery, there laid, not a saint holding the secret of health, but the most wretched and impotent of the daughters of men, clinging not so much to the cross as to a hypodermic needle.

Our Medical Libraries

Time was when the medical library connoted chiefly, to the active practitioner, bookworms, bores and banalities. That is all changed now, and the modern doctor finds the library, if he is fortunate enough to be near a good one, *his most important instrument of precision,* so to speak. Even in the course of the past ten years, the statistics of the Library of the Medical Society of the County of Kings (Brooklyn), for example, show that the number of readers has nearly quadrupled, that the number of books consulted has more than quintupled, and that the number of books taken out has increased tenfold.

The fact is that the wide-awake physician of to-day takes just as much interest in the medical library as the scholar ever did, for the reason that success in practice, considered with reference both to technics and economics, increasingly depends upon acquaintance with the best literature.

We look for an ever-increasing interest in medical libraries upon the part of our active practitioners. The scholarly wing of the profession will, of course, always be naturally identified with them.

The special appeal that is now being made by friends of the great Kings County Library for still more professional support is opportune, for there were never so many practical men convinced of the paramount worth of such vital points in our scientific system as the libraries. We cannot imagine anybody not already "sold" on this subject.

The Inferiority of Specialization

In the course of his Address in Surgery at the Seventeenth International Medical Congress, Dr. Harvey Cushing remarked that "The practitioner cannot be chemist, neurologist, bacteriologist, ophthalmologist, radiographer, surgeon and what not rolled into one, and do effective work. The Jonathan Hutchinsons of the profession are, alas, rare."

The late John D. Rushmore, of Brooklyn, was, in his time, one of the great but rare practitioners who succeed in applying, after the manner of Hutchinson, a vast range of scientific knowledge. Thus he applied equally well the medical, surgical, ophthalmic, otic, gynecic and obstetric science and art of his day. Always there was the same artistic approach to the iridectomy and the hysterectomy, to the mastoidectomy and the podalic version, to the differential diagnosis between multiple sclerosis and cerebrospinal syphilis. What versatility and ability, and what modesty withal!

And now some of our thinkers—e.g., Francis X. Dercum, Alexis Carrel, President Angell of Yale and Harlow Shapley—are pointing out that there is too great a loss of perspective and of grasp of great principles by reason of specialization in education, in practice, and in thought, and are asking how these interests and these branches of individualistic learning can be coordinated into one program with one common purpose—the promotion of all useful knowledge.

How can more Hutchinsons and Rushmores be created by the schools?

Dr. Angell thinks that some way will be found to instill into the products of the schools a proper conception, at least, of the interrelations of the applied sciences, and to recreate in a higher and better form the "old family doctor," who knew a lot of important things that our one-disease specialists are perfectly ignorant about.

Carrel pleads for a coordination of knowledge that will make it useful instead of dangerous. "Specialization is an inferior, though necessary, state of mind." He suggests the experiment of giving responsible positions to those who have mastered several intellectual disciplines and acquired a profound knowledge of an extensive domain of knowledge. "Possibly men of such type might be more influential in forming the intellectuality of young men than would successful but narrow research workers." Carrel thinks that gifted children should be protected against the leveling influence of the high and prep schools, and that the best university students should be segregated and given more active and encyclopedic training and dissuaded from early specialization.

It begins to look as though the Hutchinson-Rushmore result of schooling is to be sought rather than what we are now so painfully familiar with.

Prejudice

It was a French cynic who said in effect, "There is always something not impleasing to us in the misfortunes of our friends." It seems cruel and untrue, but look into your own heart, brother, and you must confess that the old philosopher had a profound insight into our poor human nature.

We often have been struck with the fact that in intimate conversations with so-called "distinguished", brainy men of every profession (not excepting the ministry) they are apt to damn with faint praise some confrère whom we have lauded. To be frank, doctors are probably the greatest sinners, doubtless due to the many intrigues and cliques in our noble profession. Let the name of a prominent physician be mentioned and some professional associate is prone to pick flaws in his technic, sincerity, or attitude towards the laity.

When we have had a watch repaired by a well-known jeweler and it still does not run properly, we take it to another expert, whose question is invariably, "What chap fixed this?"

So, when a surgeon sees a patient, on whom a colleague has operated without as good a result as was expected (who has not had this experience?), instead of saying a good word for his friend, he is too apt to criticize him. "My brother, these things ought not so to be."—H. C. C.

The Proposed Tariff on Surgical Instruments

The proposal of certain American manufacturing interests to increase enormously the duties on surgical instruments is opposed by the American Hospital Association, the Catholic Hospital Association, the American Medical Association, and the American College of Surgeons. The proposal, as made before a House committee in January, ran as follows:

75% ad valorem duty on all Surgical Instruments
AND IN ADDITION—these specific duties:

Foreign value per doz.	*Specific duty per doz.*
up to 25c	12c
25c to 50c	24c
50c to $1.00	60c
$1.00 to $2.00	$1.50
$2.00 to $4.00	3.00
$4.00 to $12.00	4.80
$12.00 to $24.00	6.00
$24.00 and up	7.20

THIS IS INSTEAD OF THE PRESENT AD VALOREM DUTY OF 45% AND NO SPECIFIC DUTY

Instruments costing abroad per dozen	*Would pay duty per doz.* 75%	*Plus Specific*	*Total Duty*	*% Duty*	*Compares with present duty, 45%*	*Increase*
.20	.15	.12	.27	135%	.09	200%
.30	.22½	.24	.46½	155%	.13½	244%
.60	.45	.60	1.05	175%	.27	274%
1.20	.90	1.50	2.40	200%	.54	344%
2.40	1.80	3.00	4.80	200%	1.08	344%
4.50	3.37½	4.80	8.17½	181%	2.03	302%
8.00	6.00	4.80	10.80	135%	3.60	200%
12.00	9.00	6.00	15.00	125%	5.40	178%
16.00	12.00	6.00	18.00	112%	7.20	150%
24.00	18.00	7.20	25.20	105%	10.80	133%

The situation on Luer Hypodermic Syringes is just about the same as on Instruments; the present tariff of 65% to be advanced to 85%, *plus* specific duties, as follows:

1 cc.	15c ea.
2 cc.	17c "
5 cc.	23c "
10 cc.	33c "
20 cc.	53c "
30 cc.	73c "
50 cc.	$1.73 "
100 cc.	3.73 "

an average duty of 235% as against present 65%.

The opponents of the foregoing increases argue that they will benefit only a very few who are now very prosperous, to the serious disadvantage and great expense of a very large number who can not afford the burden. Their detailed argument, as recently presented to the House committee in charge of the matter, ran about as follows:

The few who would be benefited would be a small number of American manufacturers and the very small number of workmen who would be engaged in the manufacturing of the instruments. The world's source of surgical instruments at present is Germany. A careful estimate of the workers engaged in manufacturing surgical instruments, syringes, needles and accessories in this line totals not over five thousand and they supply the entire world. If you place the duties so high as to practically exclude German instruments we could scarcely count on more than one thousand men who could be put to work here to supply the deficiency and a large proportion of these would require years of training. Germany for a hundred years has been the world's source by reason of their experience and skill, their workers trained in the industry from generation to generation. Supplying the entire world as they do, it pays them to have the dies and equipment to make up the small quantities of individual instruments that each country may use, the aggregate of all countries' wants permitting expenditure for dies, etc., that would otherwise be unprofitable. This country has no adequate facilities now—factories, equipment or trained workers to turn out even a small part of the requirements of the profession and it would take years before we could possibly build up our facilities and personnel to be able to produce any important part of our needs. They would then be produced at an enormously increased cost, profitable to a few manufacturers, benefiting a small number of workers.

The very large number who would bear the burden of increased duties would be 150,000 physicians; 50,000 dentists; 10,000 hospitals and the enormous part of the population that they cater to and whose needs they adminster, and also the medical students throughout the country. The higher prices of instruments would increase the expenses of surgeons, physicians, hospitals and students or even make the purchase of many instruments impossible by excessive cost. This would necessitate larger fees and charges, an additional burden on the sick and injured when they are least able to bear it. You may even hazard the very lives of patients by preventing by excessive cost the availability of needed instruments. Surgeons, physcians and hospitals would not purchase certain instruments used only occasionally if their cost was too great.

Miscellany

Jay Gould: Tuberculous Psychopath

These Notes on Jay Gould appeared in a recent issue of *Eugenical News,* organ of the Galton Society. They illustrate the importance of a medico-psychologic approach to certain socio-biographic problems.—*Editor.*

NOTES ON JAY GOULD

Preamble

Gould's ancestors in Connecticut (Fairfield) were able and distinguished folk. Nathan Gould, the first of the family, was a major, magistrate and what would now be called a State senator. His son Nathan, 2nd, became Lieutenant Governor and Chief Justice of the Superior Court. Next in line is Samuel, whose son Abraham was Colonel of the Fourth Regiment during the Revolution (killed in action at Ridgefield). Abraham's son Abraham, 2nd, emigrated to West Settlement (Roxbury, New York) in 1790, and his son John Burr Gould married Mary More (of Scottish stock) and became the father of Jay Gould.

Gould's ancestry included, Burrs, Bradleys and Talcotts, all of the best New England stock. Jay's name appears to have been derived from Jason, a name which is met with in earlier generations of the family. This degradation in name connotes a degradation in family tone and the emigration means that Abraham Gould was out of step with the Fairfield community.

Certain it is that life on John's farm was hard, that Jay suffered for lack of shoes, that his mother died when he was very young, that two stepmothers followed, and that his father was unable to pay for his later schooling.

As a schoolboy Jay Gould was reserved in manner. There is much evidence that he was not strong. "He seldom engaged in the sports of the school, because he was proud and exclusive, and would not put himself on an equal with the other boys. . . . I frequently went home with him and stayed all night, but he would never go home with me" (John Burroughs).

Another schoolmate writes that "In his early life he was in a measure different from boys in general, in that he did not seem to enter into the sports and games of the ordinary school boys. . . . Quiet . . . rather exclusively inclined." (*Jour. Amer. Hist.*, vii, 1913. p. 919).

At the age of sixteen Gould wrote that he desired an education above all things. But in his analysis of what an education meant to him he wrote that he conceived of it as a means of placing one "where he is capable of speaking and acting for himself without being bargained away and deceived by his more enlightened brothers," and also as a means of "controlling the human destiny in yielding happiness and enjoyment to its possessor."

In his determination to secure an education he left home of his own volition and earned his living and tuition at

Hobart Academy by keeping accounts for a blacksmith (and probably also for the school as well).

While clerking in the local hardware store after leaving school he rose at four and studied late at night.

His father buys the store and gives him its management. Father's change from farming to trade is significant, and is probably influenced by the ambitious boy, seeking an outlet for his trading instincts (note use of term "bargaining" in what he wrote at age of sixteen); certainly the store must have given opportunity for experience in the elements of bargaining. So also did his peddling of mousetraps about the country.

He leaves his father in 1852 to start surveying, under another. The surveying enterprise collapses but he completes the survey, financing himself by making "noon marks" for the farmers at a charge of fifty cents and his dinner. He always kept the ten cents remaining to him at the time of the collapse of the surveying enterprise. He soon had much surveying work to do. Surveying and map making were phases of his preoccupation with the subject of property in the form of land. The survey of a proposed railway between Newburg and Syracuse probably had a decided bearing on his later activities.

His *History of Delaware County* was based on notes made during surveys. These were lost through fire but he wrote the book nevertheless from memory. The History was published in 1856 when he was about 20 years of age.

A tanner in 1856, Gould loots his partner Pratt; survives the panic of 1857 and has a contest with his partner Leupp, who commits suicide.

Railways came next. His policy is to depress values or bring about bankruptcy by new methods of stock manipulation, then to buy. He buys stock when friends are embarassed, ruining them without contrition (*e.g.*, Field).

The rest of the story is familiar—incredibly unscrupulous manipulations and betrayals of allies as well as enemies, "Black Friday," etc.

He died of tuberculosis, 1892. Probably the infection dated back to boyhood but was latent through the years of activity. Early strains, hardships, malnutrition and aversion to sports all relate to this infection, which may be considered as one of the stimuli of his intellectual energies.

Reasons for His Make-up

Scottish and New England fusion in his parenthood hard to beat as an endowment making for thrift to the nth degree in the boy. New England alone is good, but the Scottish and New England merger defeats all other aspirants. Dimes meant to him what they have meant to the elder Rockefeller; they meant more, for in his last will not a cent was left to servants, friends, education, charity or the church.

Practically all of his boyhood was lived in an utterly lawless environment (rent wars of Delaware County). He was evidently fascinated by this social state. This preoccupation is proven by his *History of Delaware County*, which recites all details with gusto.

What he did as an individualist type of financier later harks back to the boy who made his school and community pay for his education, who brought about, no doubt, the transition from farm to store, and who invented new sources of income to continue surveying after the collapse of the enterprise. The later requisition of coal fields lying along the route of his railways was the same *intelligence* at work.

In order to understand the man who devised new methods of exploiting his fellows on a large scale, with the police protection provided by Tweed for party and personal considerations, we have simply to look back at the young man securing financial backing for his tannery project from the richest capitalist in the Delaware County district through the device of writing to the newspapers to propose the capitalist's nomination for the Vice Presidency, then under discussion, or to look farther back at the boy planning to circumvent by any means a grotesque social system that glorified poverty while it despised its victims.

What was it in the boy and man that differentiated him from his fellows? Simply a very high order of intelligence. Under modern methods of inquiry the boy Gould would unquestionably have revealed an intelligence quotient placing him in the very highest group.

We come next to a vital point in the understanding of this interesting character. What was the significance of his pride, reserve, exclusiveness and suppressed personality in boyhood? An inferiority complex, growing out of his physical frailty, poverty, hardship, social isolation, the uncouthness of his people, and the knowledge of the family's fall from prestige to a bitter struggle for survival. The boy's manners were a defensive mechanism. He compensated for his inferiority feelings by developing an ambition to acquire wealth and power. While this emotional life was in progress he faced and understood realities of a certain sort by reason of his super-intelligence, placing values upon them as he later was to value railways.

This will all be better understood by calling Dr. Alfred Adler as an expert. In his "Understanding Human Nature" Adler says: "It is the feeling of inferiority, inadequacy, insecurity which determines the goal of an individual's existence. . . . The tendency makes itself felt in the first days of life . . . with its purpose the attainment of a goal in which the individual is seemingly superior to his environment. . . . The striving for a goal, the purposiveness of the psychic life is not only a philosophic assumption, but actually a fundamental fact. . . . Children do not express their striving for power openly . . . but hide their work behind a veil. . . . An uninhibited striving for power is capable of producing degenerations in the psychic development of the child, an exaggerated drive for security and might, may change . . . tenderness into a subtle treachery for dominating the world. Every natural feeling or expression finally carries with it a hypocritical afterthought whose final purpose is the subjugation of the environment. . . . The soul under pressure of the feeling of inferiority, or the torturing thought that the individual is small and helpless, attempts with all its might to become master over this 'inferiority complex.' . . . When the feeling of inferiority is intensified to the degree that the child fears he will never be able to compensate for his weakness, the danger arises that in his striving for compensation he will be satisfied not with a simple restoration of the balance of power; he will demand an overcompensation, will seek an overbalance of the scales. . . . The striving for power and dominance may become so exaggerated and intensified that it must be called pathological. . . . When this occurs the ordinary relationships of life will never be satisfactory. . . . Where we are dealing with a pathological power-drive we find individuals who seek to secure their position in life with extraordinary efforts, with greater haste and impatience, with more violent impulses, and without consideration of any one else. . . . Their attacks on the lives of others necessitate that they defend their own lives. They are against the world, and the world is against them. . . . Other characteristics will appear which . . . will assume an increasingly anti-social color. . . . In the forefront of these manifestations is

the desire to conquer everyone at any price."

In view of the challenge of this super-intelligent boy's environment, and in view of his psychological evolution, what other course in life could he have taken? He met the challenge of a corrupt era most adequately and logically and it deserved everything it got from him.

After what has been said we can better understand what he wrote at the age of sixteen as to the meaning of education to him. When he said that it was a means of protecting oneself against being bargained away and deceived by one's more enlightened brothers he was indulging in what the psychologists call a "projection." What was really in his mind was a resolution to bargain away and deceive as many competitors and morons as possible.

What he meant by "controlling the human destiny in yielding happiness and enjoyment to its possessor" also has its sinister connotations. Conceive of the Puritan's Golden Rule and shudder.

Let us consider for a moment the New England heritage. The ownership of "flocks and herds" (see Old Testament) has always, in the Puritan mind (out of the Job mind), determined final virtue. Prosperity wins the smiles of Jehovah. Exploitation is always rationalized by this type of mind as a just and ethical use of God-given talents. The proof of Gould's essential righteousness is seen in his (one and only) benefaction to the Presbyterian organization in New York City and in the Gould Memorial Church at Roxbury. Further proof is to be found in his super-affectionate family life, which, however, is also a compensation for the hatreds of victims, with which the subconscious mind even of a Gould must reckon. Conscience or remorse did not, of course, enter his active life because of the intensity of his psychological patterns as explained in our passages based on Adler. But the buccaneer type of financier is always a sentimentalist, since sentimentality is always a smoke-screen for brutality and cruelty.

Conclusions

Such men as Gould are embarrassing because they confute our alleged morals; we do not suppress them nor desire to suppress them because they are glorious "criminals"; yet neither do we desire to have our social morals impugned.

The man is "unmoral" but the railways are civilization and culture and progress on wheels, which to the Puritan mind settles all casuistries. Material wealth nullifies all moral sophistries. In any case, the sophisticated and indomitable sinner of the Gould sort is a beau-ideal in the man-in-the-street's psychology. That man's wish-fulfilment dreams are essentially anti-social ad pivot around the Goulds and the Sinclairs. Thus is the Minotaur sainted, garlanded and garmented in purple. In our American Pantheon the Goulds are beatified and dissenting critics pedal softly. It is a delicate subject.

What would be our celebrated pirate's sincere, rationalized appraisal of himself? Individualist; captain of industry; scion of pioneering stock; man of simple and austere virtue; super-citizen; lever of progress; builder; master of high finance; inheritor of the lofty traditions of his people; a paragon of family love; a gifted competitor in the marts of trade; business dynamo; a genius dealing in media of exchange.

What really was this man? An inevitable product of definite factors, genetic and environmental, uniquely successful because of high intelligence and the development of thievery to a point where it became a fine art; a scientist working only with sordid elements and sinister methods; a super-gambler who, like every gambler that ever lived, was incapable of physical labor; a living satire upon the social system of his time; an envied magician whose sins all those sharing in the Puritan inheritance would emulate, were they intelligent enough and did only wealth accrue; an achiever of perfection in the American art of go-getting; a phenomenon totally unable to function in any other manner than that known of all men and absolutely without scruple; a speculator who campaigned like a general, with a motto "all is permitted which can be successfully accomplished"; an accoucheur of America in her big-business birth throes; a creature of the times; one of the most interesting characters in the annals of crime; a maker of America; a pattern for intelligent boys with the cards stacked against them and the dice of the Babbittry loaded; an offender to be forgiven because of the forces that played upon him and a stage that was set in corruption by the gods themselves; a humorist to be lauded for his service in carrying to their logical conclusion the true policies of the American moralist in business, at great cost to the moralists.

Nothing will ever reform our incorrigible moralists, but another Gould would wreck the wretched temple.

Are the gods, we wonder, hatching another Jay somewhere?

Coca-Cola in History

Some time a studious historian searching for the occasions and causes of the prohibition era in the United States will pen an interesting paragraph about the "soft" drink called cocoa-cola during the three decades when the late Asa Griggs Candler was manufacturing it. For twenty years he and his beverage were the centre of a controversy in the South which had sociological and political as well as pharmaceutical phases. Until the Model T Ford began to scurry about Southern roads there was no commodity of commerce so famous there as coca-cola.

After Mr. Candler bought the recipe and brought his fine industrial mind to its distribution the business grew to a point where every little drug store put in a fountain from which to serve the aerated syrup from Atlanta. When the local-option movement became formidable, mourners for beer and whisky were advised by worthy members of the community—artfully stimulated by advertising—to find in the burgandy-colored depths of coca-cola a stimulant as strong as alcohol and free from harmful effects. Consumption of the drink in the South reached such a point that brewers and distillers became alarmed and, spurred on by Mr. Candler's public and substantial support of the prohibition movement, spread the word that his soft drink contained a harmful drug.

For years the controversy raged. Every small town was divided into two camps. The pure-food authorities took a hand. Old gentlemen, sipping their juleps, thundered against introducing the Atlanta liquid into the youthful stomach. Earnest churchwomen defended it, drank it and spoke from pulpits of its innocence in contrast with beer and rum. Adventurous youths and some reformed topers discovered ways of "livening it up," and village doctors took a hand in the argument. In many Southern towns there were groups of "sanctified" people who ascribed both alcohol and coca-cola to Satan. Through the late '90s and well past the first decade of this century the battle endured, and its advertising results made Mr. Candler a multi-millionaire. A great deal of his money he subscribed to the enemies of rum in the evangelical churches. Local and county option, and finally State-wide prohibition, came to the coca-cola belt; and then the Webb-Kenyon act forbidding the shipment of liquors into dry territory made coca-cola supreme. Foreign tourists in the South, familiar with ginger-beer, marveled at the peculiar American thirst for it.

About the year when nation-wide prohibition came into effect Mr. Candler sold his holdings in the company to an Eastern corporation, and the beverage which had so stirred the South, filled roadsides and railway rights-of-way with signboards and enriched many churches, gently took its place in Big Business, where it now is. But sociologists, if so minded, can still find in the small Southern towns sad-eyed gentlemen about the Square who will ascribe to Mr. Candler and his soft drink chief responsibility for the outlawry of Bacchus and Gambrinus.—*New York Times.*

The Prevailing Ill Health and the Practitioner

The answer to the question of how the "average" physician should be trained and what he may reasonably be expected to know to meet the needs of the public may be sought, in part at least, in the records of actual practice. What are the actual demands that are made by persons for medical attention? This is an inquiry to which the Commission on Medical Education, under the chairmanship of President Lowell of Harvard University and sponsored in part by the American Medical Association, has devoted earnest consideration. Its preliminary report, issued in 1927,[1] outlines the experience of a large group of recent graduates in medical practice in communities of 50,000 or less in twenty-four states and two provinces. A study of their activities reveals that most of the illinesses are not difficult of diagnosis or treatment, and probably 90 per cent can be cared for by a competently trained practitioner with modest equipment and facilities. About 75 per cent of the office visits were for minor surgery, general medical and venereal diseases, and upper respiratory infections. About 90 per cent of home visits were for infections of the respiratory tract, general medical and contagious diseases, obstetrics and minor surgery. More than 90 per cent of the illnesses are of types which cannot be controlled on a community basis but are problems of individual patients. Less than 10 per cent are diseases against which public health efforts are mainly directed. Incidentally, this fact is an index of the growing efficiency of public health efforts and also emphasizes the necessity of treating the patients as well as the disease.

Subsequent studies also justified, in the words of the commission, the common opinion that a rather large proportion of practice is confined to a relatively few diseases, whether in general or in special practice. It is clear from the studies, however, that in general practice physicians should be qualified to recognize serious conditions in their incipient stages, such as cardiorenal, malignant and tuberculous diseases, and that general practitioners should be prompt to see that patients suffering from any of these serious diseases have attention from those who are qualified by special preparation to deal with them. In the field of the specialties the data emphasize that a large fraction of special practice is made up of diseases incidental to more general conditions: that the practitioner of a specialty should be familiar with diseases outside his own specialty, and that he should be unwilling to treat conditions which can be handled better by some one else. The report adds that the discrimination and judgment necessary for both the general practitioner and the specialist in dealing with the different illnesses which they are called on to treat is a difficult but well known aspect of medical practice.

The morbidity survey of certain districts in rural New York, as recently reported by DePorte,[2] brings added elaborate evidence of the numerically unimportant position of the reportable communicable diseases. Even if the nonreportable diseases that come within the field of organized public health activities, such as diarrhea and enteritis (under 2 years), syphilis and gonorrhea, were to be added, DePorte states that the cases of the enlarged group of diseases would equal only 5.6 per cent of all causes of illness represented in the survey. Out of thousands of cases of sickness in villages and towns, about 95 per cent included nonreportable diseases, among which "colds," digestive disorders, surgical cases, neuroses and noncommunicable diseases of children represent a large fraction. The common causes of disabling illnesses and absenteeism correspond closely with 80 per cent of the combined office and home visits of the general practitioner. The obligation and opportunity of the practitioner of today are obvious. The diseases responsible for the bulk of mortality are comparatively inconspicuous among the causes of prevailing ill health. DePorte's study stresses further that greater attention should be given by public health authorities and the practicing medical profession to the nonreportable diseases which are responsible for most of the prevailing ill halth.—*J. A. M. A.*, March 23, 1929.

[1] Three reports have already been issued and are available for distribution through the Director of Study, 215 Whitney Avenue, New Haven, Conn.

[2] DePorte, J. V.: Sickness in Rural New York: Morbidity Survey of Certain Districts in 1927, J. A. M. A. 92:522 (Feb. 16) 1929.

Medical Practice and Preventive Medicine

Dr. Theobald Smith, the pathologist, in an address at the New York Health Conference, discussed the delicate subject of the attitude of medical practitioners toward organizations interested in preventive medicine. At the beginning of what he calls the "bacteriological era," the two were seemingly facing each other as competitors. Gradually, however, they have been drawn together by the force of truth which has come to both as the result of research. Yet there is still a difference in emphasis, as is clearly set forth in the following balanced characterization of the two:

The organizations devoted to problems of infectious diseases have seen only the microbe. The physician has seen the effects of heredity and special constitution in the variations between individual members of the same family in many reactions toward disease. He had been clinging to heredity in tuberculosis until dislodged by the bacillus, and now he is returning again to a modified view of heredity, with the bacillus in full view, however. Preventive medicine looks with dismay on healthy carriers, but the physician may regard them as normal. On the other hand, the physician realizes that there will always be disease, either of one kind or another, whereas the public health worker has dreams of completely suppressing infectious diseases.

Furthermore, public health agencies are concerned with mass phenomena and record their progress by statistics, whereas the physician deals with the individual and is not helped by the fact that 95 per cent of the operations for a particular ill are successful. That does not tell him whether the case in hand belongs to the 95 per cent or the 5 per cent. Experiment assumes a certain uniformity, while practice has to contend with complications. The conclusion is that each needs the other as a corrective and that they must work together. They are the "two wings of medicine," and each is essential to the other in functioning for the community good. Not only must the accidents and infirmities of the moment be looked after, but there must be a peering ahead to avoid what is approaching.

It is more difficult to appraise the value of preventive work. Averting an epidemic by discovering infection in water, for example, does not receive the attention that is given the saving of a single life by surgery or by medical treatment and care. And yet, as Dr. Smith adds, the

casualties and catastrophes that do not happen because of such preventive activities "would make fairy stories ordinary reading." To anticipate and so to control the immediate future is "the highest achievement of civilized society." And the treatment of disease is gradually losing its "character of emergency," and is employing the element of time and the recuperative power of tissues. For the great army of public health the physician must be "the outpost." This conference of the medical practitioners and the workers in the public health organizations is a hopeful symptom, for both are essential to the community.—*New York Times.*

Present—But Not Voting

Though dead for nearly one hundred years, the dressed up skeleton of Jeremy Bentham, with his head between his feet, sits in uncanny silence at the head of the hospital board around which the trustees of the University College Hospital in London gather. Jeremy Bentham founded this hospital in 1827, and presided at the first meetings of the Board of Trustees—and he still does to this day, although he died in 1832. Each meeting of the board has found his weird figure at the table. His gaunt form is erect, his sightless eyes stare outright, and his broad-brimmed beaver hat is never removed from the long locks that dangle down on his shoulders, nor is his gloved hand ever taken from the cane that it has rested upon for over one hundred years. And as the various important bits of business come before the board, old Jeremy is consulted, and when no answer comes from his grinning teeth, he is recorded as: PRESENT—BUT NOT VOTING.

This dressed up bag of bones and dust of what was Jeremy Bentham sits at this board because the living Jeremy Bentham willed it so. When Bentham died he left his whole fortune to the University College Hospital, but on the condition that his skeleton be preserved and placed in the President's chair at every board meeting * * * in the twilight of his life he was alone and without a family, and it was then evidently that the idea of self-perpetuation came upon him and the idea of always being present at the meetings of the institution that he founded took definite course in his will.

It was in accordance with this last weird flare of his genius that his testament demanded that his head be severed from his body in the presence of his friends and placed in a separate glass case which now rests between his ankles, while a mask, a life-like replica of his living face, be placed upon his shoulders instead. And so he has sat for nearly a hundred years, always present, but not voting.—From *Believe It Or Not*, by Robert L. Ripley.

The Rural Doctor

The gift of Mr. Lucius N. Littauer to the Albany Medical College lends another hand to the effort which that institution has been making, with the active cooperation of the Rockefeller Foundation, to "strengthen the medical defenses" of the towns and villages of Northeastern New York. The particular purpose of this gift of $50,000 is to bring the Gloversville Hospital into contact with the Medical College. It will make it possible for the advanced students to become familiar with the problems of medical practice in that district. Those who come later to settle in that part of the State will already have a knowledge of the local facilities and be able to take prompt advantage of them. Further than this, the college will seek through this relationship with the Gloversville Hospital to be of aid to physicians and surgeons in that region by helping them to keep in touch with the advances made in medical science.

What has been done for the Albany Medical College and the Gloversville Hospital suggests that such contacts might be more widely made with profit to the entire region which the college seeks primarily to serve. The fellowships for which Mr. Littauer has also made provision will give opportunity for research work to specially qualified students. Thus, in all these interchanges, talented men will be discovered and developed and later brought back, so far as possible, to serve the district from which they have been drawn. The gist of it is that students are kept near the communities of the type where general practitioners are most needed today. With the drift toward the cities, it is estimated that a third of the towns in the United States of 1,000 inhabitants or less have no doctors.

The experiment of the Albany Medical College in the region extending from the Catskills to the Canadian border and westward from the Hudson Valley up the Mohawk to Little Falls is therefore of more than local interest. The telephone and the automobile are widening the reach of the physician and the surgeon. Perhaps some day the airplane will give him still wider scope for his skill. But there will always be need of doctors who know rural life, who are near to it, and who are willing to give their best to it.—*New York Times.*

Balloon Hospitals

Aerial hospitals, lifted miles above the earth on great balloons so that sick people can have the advantage of the pure air and undiluted sunlight high above the clouds, are suggested by Dr. W. Oppel, head of the Metchnikoff Hospital in Leningrad, Russia:

"Admitting that his plan seems at the moment too fantastic for actual trial, Dr. Oppel urges its undoubted benefit to the patients' health as a sufficient reason why engineers and aviators should plan and experiment in this direction until perhaps such flying health centers may become possibilities. Physicians know, Dr. Oppel points out, that the climate of high mountains is beneficial in many diseases, notably tuberculosis. In his own city of Leningrad one of the difficulties in treating such diseases is that no near-by mountains are available. Even in countries like Switzerland, where mountains do exist, the tops are seldom high enough, Dr. Oppel believes, to obtain the benefits of lifting sick people entirely above the cloud layer and into sunlight unaltered by dust or smoke. Why not urge aircraft engineers, he asks, to devise great metal structures, open on four sides to the air, roofed with ray-transparent glass and lifted by great gas bags at the four corners, to provide aerial homes for scores or even hundreds of the sick. Supplies or patients could be carried up or down by small captive balloons."

Medical Prescriptions of Alcohol

The Bureau of Prohibition of the Treasury Department has just made available statistics regarding the use of intoxicating liquors under official auspices in the United States. The pamphlet concerned provides statements pertaining to the amounts of various types of alcoholic liquors produced and used at various times previous to and since the passing of the eighteenth amendment, as well as full information concerning arrests, seizures and other activities of the Prohibition Department. During 1928, 68,951 physicians used prescription books as contrasted with 48,097 in 1927. The number of licensed physicians in those states which permit the use of liquor for medicinal purposes is 116,756, so that a little more than one-half the total number of physicians

permitted to prescribe alcoholic liquors avail themselves of the opportunity. During 1927, 14,948 physicians used one book during the year; 8,743 used two books; 10,861 used three books and 13,545 used four books. Apparently, therefore, slightly more than 10 per cent of all the physicians who might prescribe alcoholic liquors used the total number of prescriptions afforded them by the government. The total number of prescriptions issued during the year increased from more than eight million in 1922 to approximately thirteen and a half million in 1925 and then decreased to less than twelve million in 1927. July 1, 1927, there were outstanding 94,958 permits for physicians, dentists and veterinarians to prescribe and use intoxicating liquor. During the year 16,906 new permits were issued, 10,405 were canceled, surrendered or expired, and 407 permits were revoked. At the close of the year, therefore, the number of outstanding permits of this kind had increased to 101,052. These figures are offered without comment in order that the medical profession may have some conception of the status of medical prescription of alcoholic liquors.—*J. A. M. A.*, March 30, 1929.

The Child's Bill of Rights

The ideal to which we should strive is that there shall be no child in America:

That has not been born under proper conditions;

That does not live in hygienic surroundings;

That ever suffers from undernourishment;

That does not have prompt and efficient medical attention and inspection;

That does not receive primary instruction in the elements of hygiene and good health;

That has not the complete birthright of a sound mind in a sound body;

That has not the encouragement to express in fullest measure the spirit within which is the final endowment of every human being.

—*Herbert Hoover.*

Biological Progress in Britain

London, April 2.—When a woman's nose is slightly crooked and inclines toward the left she is likely to become the mother of sons, but if it turns toward the right it is more possible she will bear daughters, according to Mrs. J. M. Erskine in her latest book, "Why Be Childless?"

Mrs. Erskine, wife of the member of Parliament for St. George's, Westminster, has studied sex determination for a number of years.

"I submitted some of my latest deductions to an eminent biologist recently," Mrs. Erskine writes in her new book, "and he displayed intense interest in the question of the effect of spinal curvature on sex determination.

"I pointed out to him with what precision I could foretell the inclination to male or female offspring in women according to the tilt of the shoulders and hips.

"When the left shoulder is higher and shorter from neck to arm than the right one, or when it is pushed out and forward, the organs corresponding to that side will be less well developed, dwarfed, depleted or congested. There will then probably be a natural preponderance of boys born to that woman.

"When the right shoulder is hunched and awkwardly tilted, the spinal curvature will have affected the organs to such an extent that to those women daughters only will ordinarily be the order of the day."—*United Press.*

The Physician's Library

Tuberculosis and How to Combat It. A Book for the Patient. By Francis M. Pottenger, A.M., LL.D., F.A.C.P. Second edition. St. Louis: The C. V. Mosby Co. 1928. Price $2.

This work first appeared in 1921 and its reception by the general reading public seems to have been satisfactory to the author, although the interval between the publication of the first and second editions is rather long. He admits that not much change has been made in the text, although evidently everything has been done in the way of incorporating new matter when the necessity arose. Chapter IX entitled The Will to Get Well is entirely new, two pages in length, and intended to give the impression that the will to recover is an absolute necessity to turn a nominally incurable into a curable case. The will is expressed by following religiously all the Do's and Do'nts of the medical guide. While this will to recovery may turn the scale in a certain per cent of cases, Trudeau's dictum that the majority of applicants to sanatoria are doomed from the start must be taken into account and perhaps the author means that the will only figures in the case of patients admitted for treatment as a result of cautious selection.

The Technic of Local Anesthesia. By Arthur E. Hertzler, Professor of Surgery in the University of Kansas, etc., etc. Fourth edition. St. Louis: C. V. Mosby Co. 1928. Price $6.

This work first appeared in 1925 and as it has been copyrighted but twice (1925, 1928) two of the editions may only represent reprintings. Prefaces are given to the third and fourth editions only and no information is afforded as to the evolution of the book from its original to the present edition. There is no bibliography and most of the text-references are old (we find but two which are subsequent to 1924). Considering the enormous activity in the field of local anesthesia of all kinds we can hardly visualize the book as fully abreast of the time—that is, as a compilation; but as a thoroughly personal book and safe guide for the practitioner we do not doubt its great merits—the author's other surgical works, on the peritoneum and its surgery, the thyroid, etc., should be sufficient warrant for this judgment.

Injection Treatment of Internal Hemorrhoids. By Marion C. Pruitt, M.D., L.R.C.P., S. (Ed.), F.R.C.S. (Ed.), F.A.C.S., Associate in Surgery, Medical Department Emory University, etc. Pp. 137, illustrated. St. Louis: C. V. Mosby Company, 1929. Price $3.00.

This is a useful little book for those who desire better to acquaint themselves with the proper technic of hemorrhoid injection with phenol solutions, as well as with anatomical and pathological data and the clinical record of this type of treatment. The author deals ably and fairly with his controversial subject. He is a strong advocate of the injection method as against the usual operative procedures.

The Injection Treatment of Hemorrhoids. By Dr. Charles Conrad Miller. Chicago: Modern Surgical Publications. 1929.

Dr. Miller's great activity and versatility in the province of surgery are in marked contrast with the tendency of certain operators to limit their activities to certain special operations. Within a very short period he has published eight monographs in book form on a wide variety of subjects. His combined clinical experience must be enormous, yet he does not make any announcement as to his public clinical facilities. The little volume comprises 124 pages with 20 illustrations, yet a perusal of the text shows most of the case material, some of the pictures and much of the technic are borrowed from numerous authors in both Europe and the United States. Cases 1 and 7 and some of the rules of procedure apparently are personal to the author, and we infer that he is on the staff of the Minneapolis General Hospital. There are long quotations from the writings of Anderson, Elsner, McPheeters and Rice, Bensaude and Oury, Murphy, Pruitt and others which are so handled that the careless reader would take them for the personal experience of the author. The book will certainly be found a valuable compilation on the injection treatment of both external and internal hemorrhoids, but the author should segregate his own experience, principles, etc., from that of his quoted authorities and should also place on the title page his clinical and other affiliations.

International Clinics. Vol. 1, 39th series, 1929. J. B. Lippincott Co., Phila. Pp. 303.

Three splendid articles by Dr. Lewellys F Barker; Dr. d' Herelle writes on the bacteriophage; Dr. Flexner on poliomyelitis; Dr. Roberts on pellagra. Dr. Coupal ends the volume with an article on the progress of medicine in 1928. The usual high standard of this publication is maintained.

The Climacteric (The Critical Age). By Gregorio Maranon, Professor of Medical Pathology in the University of Madrid. Translated by K. S. Stevens. Edited by Carey Culbertson, A.B., M.D., F.A.C.S., etc. St. Louis: C. V. Mosby Co. 1929. Price $6.50.

This volume originally appeared in Spanish in 1919, with a second edition in 1925, and the author himself contributes a preface to this English edition. The number of pages is 425. In the first place the book is a very thorough compilation with an author index of about 400 names. Second, it is an eminently personal book, for there are incorporated over 100 case histories from the author's own practice. Of no little value is the chapter on the male climacteric. The author does not believe in the existence of a short climacteric period in the male—usually supposed to appear about the age of 63—which may be followed by an interval of relative health; but he does recognize the existence of a retrogression in several of the endocrine glands, notably the gonads, adrenals and thyroid, which is of slow evolution and much less pronounced than the female climacteric. In covering the subject of the menopause, the author has naturally availed himself freely of the writings on this subject of classics like those of Vinay and Kisch, with the more recent researches of Schickele and his collaborators, and the findings of such modern endocrinologists as Biedl, Falta, Pende and Barker (who however do not dip deeply into the subject), and the more specialized writings of Blair Bell, Bandler, Zondek and others. It is rather a critical time in which to produce an authoritative work on this subject, but the author has produced an unusually valuable work, the wonder being that he did not issue his book originally in French or some other language which would give it greater initial availability.

Medical Information in Sickness and Health. By Philip Skrainka, M.D., formerly Editor of *Medicine and Surgery*, with a Foreword by W. A. Newman Dorland, A.M., M.D., F.A.C.S. Pp. 577, including index. Coward-McCann, Inc., New York, 1929. Price $7.50.

We can conceive of no severer test of a medical writer than the creation in this age of a work on "household medicine" that will really serve the public a useful purpose and also stand up successfully under the criticisms of the profession. A man who can meet the requirements must be a kind of Huxley, understood and honored by both public and colleagues. Dr. Skrainka, it appears to us, qualifies.

Such a book is needed to-day as one more preventive-medicine lever, so to speak, and antidote to quackery; written lucidly along modern lines, the accomplished author's work supplies the need.

A careful examination of the book shows it to be scrupulously ethical, judicious in all counsel, and of remarkable scope. It serves a wholesome auxiliary purpose in the medical scheme of things.

A pleasing vein of humor and much worldly and scientific wisdom run through the book. The chapter on Outwitting Our Nerves; Outwitting Old Age; and Other Outwittings is a charming satire calculated to outwit a vast deal of quackery.

A chapter labeled Miscellaneous deals wisely and well with "subjects of paramount importance to-day in the life of the American people."

In the table of contents the page number of each topic is given, while the book's index runs to sixteen pages. Professor Dorland, of the Chicago Post-Graduate Medical School, author of the American Illustrated Medical Dictionary, gives the book his imprimatur in the foreword.

Lecons du Dimanche. From the Medical Clinic of the Hotel Diev, Paris. By Drs. Paul Carnot, Sainton, Bensaude, M. Villaret, H. Benard, A. Baudouin, Diocles, Tiffeneau, Halbron, Rathery, Harvier and Chabrol. Pub. by J. B. Bailliere et Fils, Paris, 1929. 20 francs.

The Hotel Diev is noted for its famous clinics; it is the oldest hospital in the world. Professor Carnot is the successor of the late Professor Gilbert, one of the world's foremost clinicians. This book of 273 pages includes several of the Sunday lectures at the Hotel Diev. Prof. Tiffeneau discusses the newer diurectics; Dr. Charbrol writes on insulin coma; Dr. Diocles gives modern gastro-intestinal radiologic technics. There are many other valuable articles in the volume.

Erythema Nedosum. By J. Odery Symes, M.D. Wm. Wood and Co., New York, 1929. Pp. 72. Price, $2.00.

A study of erythema nodosum, based on thirty years' experience. The author gives a brief clinical history of the disease; etiology and pathology are considered; the relationship to tuberculosis and other diseases; diagnosis, prognosis and treatment. The author gives a timely warning that this disease must be regarded as a danger signal as a warning that tuberculosis may exist or may develop. It is a valuable contribution.

Technique of Contraception: The Principles and Practice of Anti-Conceptional Methods. By James F. Cooper, M. D., Medical Director of the Birth Control Clinical Research Bureau, etc. Day-Nichols, Inc., New York. 1928.

This is the fourth printing of Dr. Cooper's work in the course of the past year. It all boils down to the Ramses pessary and lactic acid jelly. Statistics covering five years research are presented to show that the percentage of success is high—about 97 per cent—provided proper instructions are given and pessaries of the right size are fitted by a physician skilled in applying contraceptive methods. Suitable illustrations clarify the text where needed, Federal and State laws are summarized, the legal status of eugenical sterilization is considered, American, English and Continental practice is discussed, and a useful bibliography completes the work. There is no index but the full table of contents partially makes up for this deficiency.

Textbook of Clinical Neurology. By M. Neustaedter, M.D., Ph.D., Visiting Neurologist, Central Neurological Hospital, Welfare Island, etc.; 228 illustrations, some in color; pp. 602, including index. F. A. Davis Company, Phila. 1929. Price $6.00 net.

As Professor Fisher says in his Introduction, a new textbook should be a distinctive contribution. This work meets Dr. Fisher's requirement. Sympotomatology is the book's keynote. Brevity, lucidity and adequacy characterize all sections of the text. There are an unusual number of excellent illustration. Poliomyelitis, encephalitis and tremors receive much original elucidation. The book is written for the practitioner, not for the specialist, hence the arrangement of material is *according to its actual occurrence in medical practice.* The reader will not have to dig around to find the particular data that he needs. Thus it is a bedside book, with the vast personal experience of the author revealed engagingly throughout.

The Facts of Modern Medicine. A Simplified Statement of Established Knowledge on Medical Subjects, with Reference also to Certain Current Misconceptions. By Francis W. Palfrey, M.D., Instructor in Medicine and in Hygiene, Harvard University. Pp. 490, including index; 31 illustrations. New York and London: D. Appleton and Company, 1929.

The greatest care has gone into the writing of this book for the laity and beginning medical student, as would be expected from the distinguished author of *The Specialties in General Practice* and *The Art of Medical Treatment.*

It is "a preliminary view of the whole subject, drawn in broad outline but with all its parts in true perspective."

The aim of the author is at once to lessen the difficulty of medical study and to advance the laity's general knowledge of medical matters. Regarding the latter point, it is the author's belief that "if the basic facts of medical knowledge are thus made available to the educated public, a better mutual understanding between the public and the medical profession will result."

It seems to this reviewer that Dr. Palfrey's book will serve its avowed purpose superlatively well; he cannot conceive of a more adequate performance of its sort. In the vernacular, it's a What's What of the basic sciences and a Who's Who of diseases.

Acidosis in Methyl Salicylate Poisoning

A review of the literature of methyl salicylate poisoning is given in the "Journal of the American Medical Association" (90, xviii, 1438) by J. G. M. Olmsted and C. A. Aldrich. In two cases reported the authors said the patients were young children and were similarly treated. The first patient, aged four, was given sodium bicarbonate in 5-per-cent solution by rectum at once, and was able to retain about 60 c.c. every two hours. Sodium bicarbonate was also given by mouth during the day, about 3 gm. being retained. This was given in 700 c.c. of sweetened orange juice and 360 c.c. of water. At 8 p.m., 500 c.c. of a 6-per-cent. dextrose-Ringer's solution was given by hypodermoclysis with 7½ units of insulin. A consultant advised the administration of larger doses of alkalis, and she was accordingly given 1 gm. of sodium bicarbonate every hour in sugar followed by orange juice until the urine became alkaline. This happened at 9 a.m. after she had taken 11 gm. of sodium bicarbonate, about 520 c.c. of orange juice, and 570 c.c. of water. This made a total intake of about 2,750 c.c. of liquids, with which was given 14 gm. of sodium bicarbonate exclusive of the amounts given by retention enemas and the alkali in the Ringer's solution. By noon the day after admission she was able to eat mashed potato and chicken; she was discharged the next morning. A table of symptoms, treatment and results observed in nineteen cases accompanies the monograph. The authors believe that in methyl salicylate poisoning acidosis is the dangerous pathologic lesion. Only five of the fourteen patients with severe poisoning recovered, and of these, three were given alkalis.